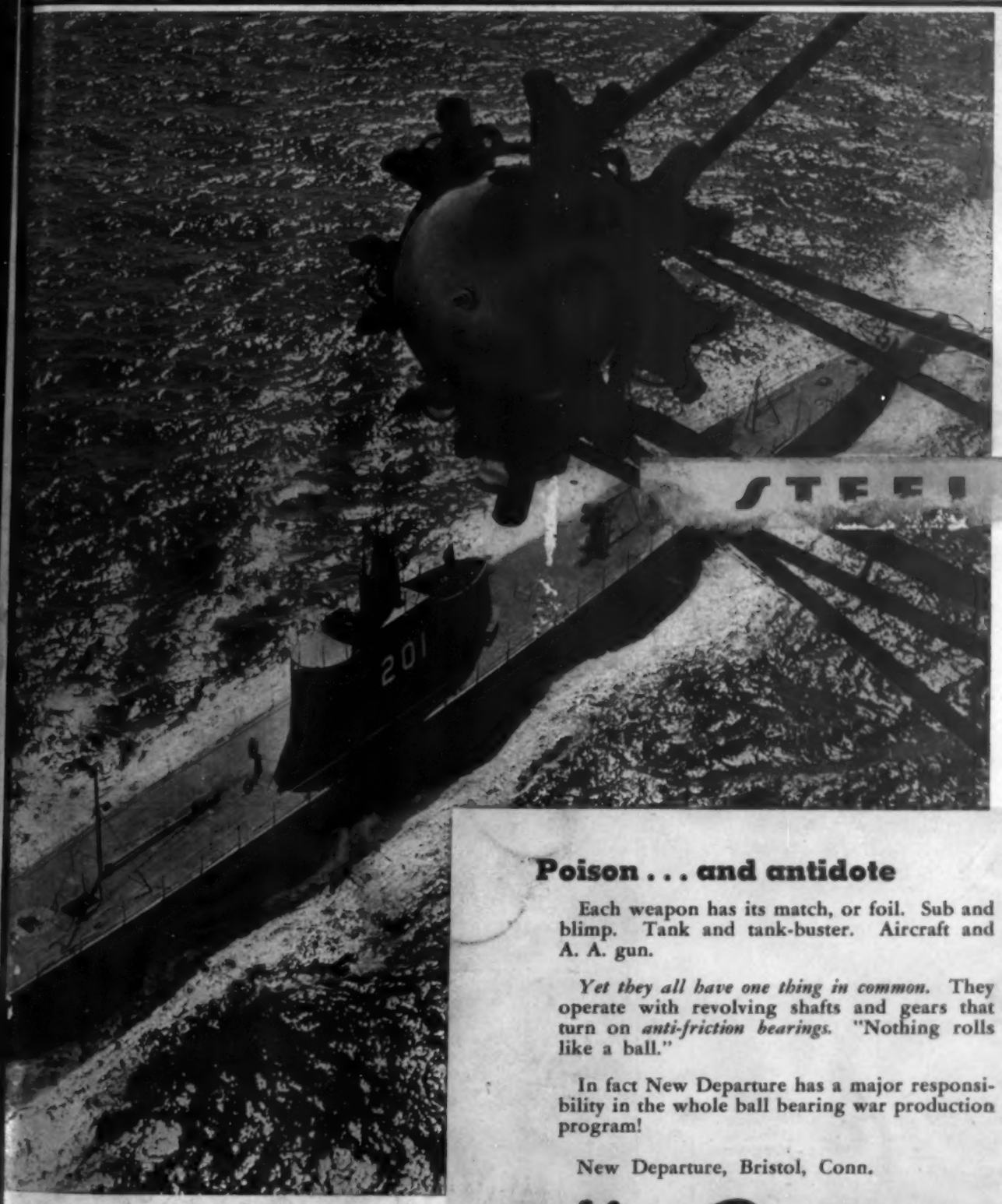
May 3, 1943

STEEL

The Magazine of Metalworking and Metalproducing

ECHNOLOGY DEPT.

ESTABLISHED 1882



Official U. S. Navy Photo from Harold M. Lambert

Poison . . . and antidote

Each weapon has its match, or foil. Sub and blimp. Tank and tank-buster. Aircraft and A. A. gun.

Yet they all have one thing in common. They operate with revolving shafts and gears that turn on *anti-friction bearings.* "Nothing rolls like a ball."

In fact New Departure has a major responsibility in the whole ball bearing war production program!

New Departure, Bristol, Conn.

New Departure

THE FORGED STEEL BEARING

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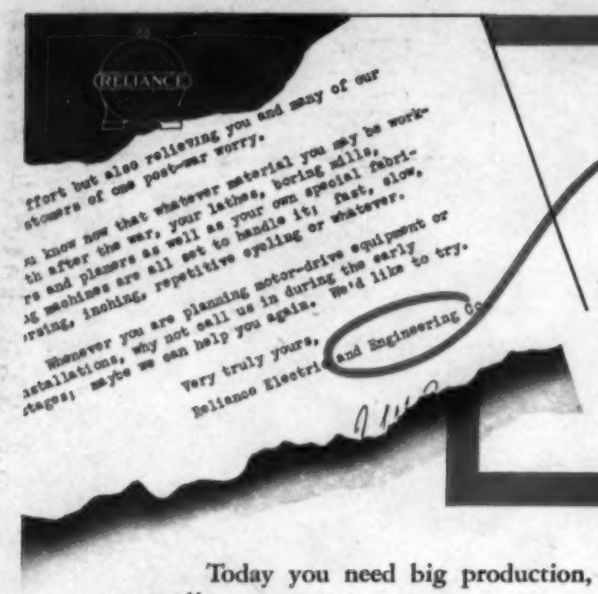

RELIANCE
ffort but also relieving you and many of our
stomers of one post-war worry.
u know now that whatever material you may be work-
th after the war, your lathes, boring mills,
rs and planers as well as your own special fabri-
g machines are all set to handle it; fast, slow,
rsing, inching, repetitive cycling or whatever.
Whenever you are planning motor-drive equipment or
stallations, why not call us in during the early
tages; maybe we can help you again. We'd like to try.
Very truly yours,
Reliance Electric and Engineering Co.

These two words make motor-drive more than power!

Today you need big production, high quality.

Tomorrow? The same requirements, probably; but with new methods and processes.

Fortunately, in your motor-driven equipment you can meet today's needs and, at the same time, be preparing for tomorrow's unknown demands. It takes good motors AND ENGINEERING.

Adapted to your needs, Reliance motor-drive can do *many things* for you.

If you design or use motor-driven machines or equipment, you need to get the right answer to this question: *"What can we make a motor do besides supply power?"*

Reliance Application Engineers—production-minded men with wide experience in providing flexible power and control through the use of motor-drive—can help you get the answer.

You will like the way they work. Just phone or write to our nearest office.

Motor-drive provides within itself a means of:

Speed Control	Reversing
Braking	Remote Control
Tandem Operation	Controlled Acceleration
Tension Control	Safety

Slow Speeds for inching, threading, inspection

Applying them to boost production and improve quality is APPLICATION ENGINEERING. That's our business.

A Reliance 50 hp. Squirrel-cage motor, specially designed to operate the geared table between stands of this hot blooming mill, is demonstrating decided advantages over the d-c. mill-type motors customarily used—lower initial cost, simpler parts and less "time-out" for maintenance; splash-proof to withstand flying scale; rugged, with roller bearings, to withstand continual starting, stopping and reversing as the bloom is manipulated.

RELIANCE ELECTRIC & ENGINEERING CO.
1088 Ivanhoe Road • Cleveland, Ohio

BIRMINGHAM • BOSTON • BUFFALO • CHICAGO
CINCINNATI • DETROIT • GREENVILLE, S. C.
HOUSTON, TEX. • LOS ANGELES • MINNEAPOLIS
NEW YORK • PHILADELPHIA • PITTSBURGH
PORTLAND, ORE. • ST. LOUIS • SAN FRANCISCO
SYRACUSE, N.Y. • AND OTHER PRINCIPAL CITIES

RELIANCE A-C D-C MOTORS

Tech

Springboard for Airpower

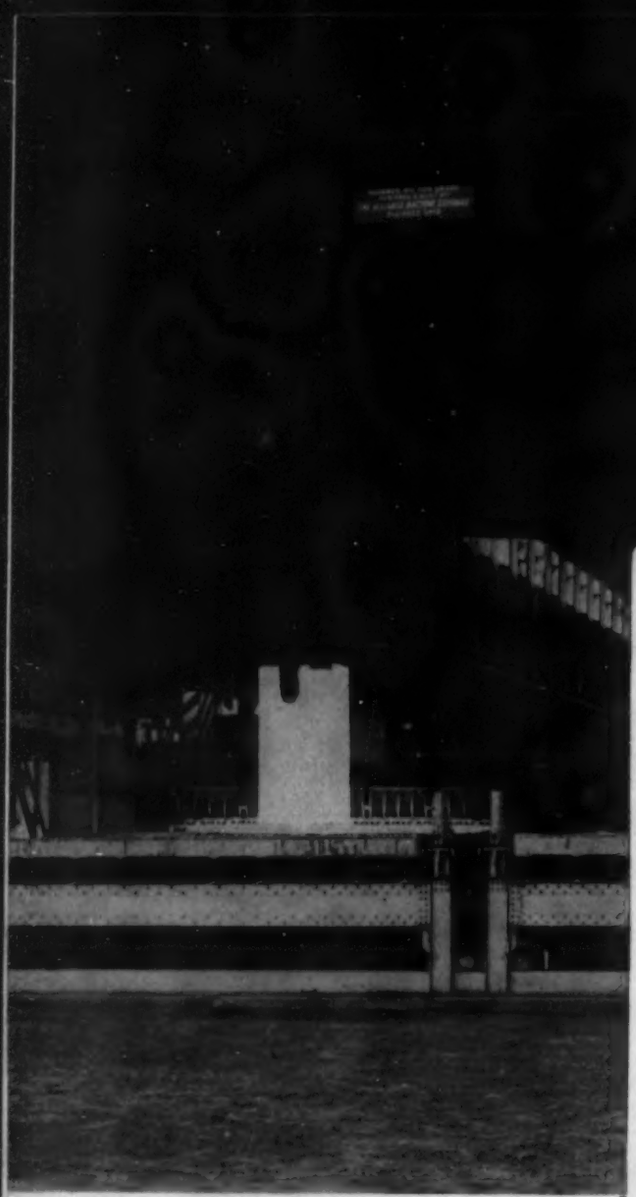
Just strips of steel 18 inches wide by 10 feet long, punched full of holes and made so that when you lay them down side by side, they lock together.

But assemble some thousands of these strips and you have a potent weapon—a military runway. Runways made in this way are serving as springboards from which Flying Fortresses, Grumman Wildcats and A-20-A's are being launched against the Japanese north of Guadalcanal, and against the Nazis in North Africa.

Bethlehem's main job in the landing mat program is supplying a tremendous tonnage of sheet steel to many fabricators for processing into these mats. Monthly production has been growing fast, and has already reached a figure that might mean something to an enemy ad-reader, so we can't quote. But when you realize that just one military runway eats up 3,000,000 pounds of sheet steel, you get an idea of the magnitude of the program. Supplying steel for landing mats is only one of the many ways in which Bethlehem is working to aid our armed forces.

Due to the great need for landing mats in a hurry, Bethlehem Steel Company has converted a portion of its building specialty department to the production of these mats for the duration of the emergency.

BETHLEHEM STEEL



Official Signal Corps Photo

ARMY E NAVY

LADLE CRANES · GANTRY CRANES
FORGING MANIPULATORS · SOAKING
PIT CRANES · STRIPPER CRANES
SLAB AND BILLET CHARGING MACHINES
OPEN HEARTH CHARGING MACHINES

★

STEEL PRODUCTION MAINTAINED FOR M-4 TANKS WITH . . . . . ALLIANCE CRANE DEPENDABILITY

Promoting security for sustained steel production is the job of Alliance Engineers. They offer big, rugged cranes, manipulators, and charging machines to production men who want long, unfaltering operations without time out periods for maintenance. Better yet, Alliance Machine Company designs and builds equipment that utilizes fully the physical advantages afforded by steel plant properties, and has a knack for overcoming many of the obstacles, too. At the same time, Alliance equipment synchronizes various production operations with such speed, accuracy, and dependability that it makes a sound contribution to increased steel production. Many of America's largest steel plants, that are producing vital materials in ever increasing quantities for tanks, boats, shells, bombs, etc., depend upon the security which Alliance equipment provides —not only by its sheer performance, but also by its trouble-free operations.

Alliance

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THAT WHEEL YOU RECOMMENDED HAS ELIMINATED OUR BOTTLE-NECK AND NOW OUR PRODUCTION IS REALLY GOING TO TOWN
THATS MY JOB "PROTECT YOUR PRODUCTION"
MACKLIN FIELD ENGINEER

Macklin Grinding Wheels are made in all sizes and shapes for every type of grinding job. An experienced Macklin Field Engineer is available at all times for the asking—no obligation.

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Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

BEHIND THE SCENES

No Author's Corrections

■ One of the best indications of the effectiveness of articles in a paper like STEEL comes from the authors—men, who because of their particular knowledge on a subject have been invited by the editors to spread their "know how" into other plants with similar problems. Here are three comments that were in this morning's mail:

E. S. Evans, president, Evans Products Co., Detroit—*Increased Payloads-Decreased Shipping Damage*, April 5-19 issues: "I am very much pleased at the way you described the modern loading methods which have been developed. You will probably be interested to know that there is a tremendous undercurrent of interest among the railroads in this type of loading . . . to meet truck and air transport competition."

James G. Leach, supervisor of training, Westinghouse Electric & Mfg. Co., Lima, O.—*Job Training in the Shop*, April 5 issue: "I offered this story as a suggestion to any other companies who are today faced with the same type of training problem. I believe it has done just that because I have received several inquiries and I hope they will get as good results from the material we are sending them as we have."

G. Eldridge Stedman—*Casting Aluminum Cylinder Heads*, April 12-19 issues: "Your handling of the material was excellent. While here in Chattanooga at least a dozen leading industrialists have phoned saying they read the first section with interest. One of the great values I have noticed from such writings is the decided morale values to the men within the shop. At Servel aluminum foundry these men have done a whale of a job, and they have shown the article to their families and to workers in other Evansville plants."

STEEL Goes To Jail

■ Comes a request this week from Clinton T. Duffy, Warden, California State Prison at San Quentin, for copies of STEEL to go into the new "Occupational Information File" he is establishing for the inmates. Back copies are on their way to be read, we hope, by former steelmen and metalworkers who somehow strayed from the straight and narrow.

Lesser of Two Evils

■ One of the best stories John Knox brought back from his western trip was about the group of lathes he noticed clear over in one far corner of a shop he visited with a crew of women operators. All they were turning out was Brinnel test pieces but the physical laboratory was clear across the plant. When he and his guide got around to there he noticed a room right beside the lab, which would have easily handled the lathes and been much more convenient. Being a good reporter, and inquisitive, John asked why not put the lathes in this unused room?

"Well," replied the superintendent, "we had them here at first, but you'll notice the women's lavatory leads right off this room and after trying everything we could think of to keep the gals at their machines without much luck, we finally decided the easiest thing to do was just to move the lathes. And it's worked."

Shades of WPA

■ Equally good perhaps is the temporary worker he chinned with up in Seattle. Waiting to go on up into Alaska, this chap had just been out to a local mill to see about a three or four weeks' job but they'd only offered him 85c an hour. "Why shucks," he said, "I can go right down to the shipyard and get a job totin' water at $1.00 an hour—and they don't even give you a bucket!"

Diapers Go To War

■ **Add this one to your list of epoch-making decisions handed down by OPA:** ***A baby's diaper service annually accumulates a quantity of washed diapers which cannot again be used in their rental service because of their soiled condition. It then sells them to purchasers who use them for wiping purposes. Although these diapers are waste material, the resale of them to an industrial consumer for wiping purposes takes them out of the exemption of Supplementary Regulation No. 1 and makes them subject to the General Maximum Price Regulation.***

Get 'Em While They're Hot

■ Even to the point of becoming redundant, we can't help but continue to express our amazement at the tremendous interest in the NE Steel Handbook and NE Steel Selector. The orders pile in every morning from steel producers, manufacturers of all kinds, warehouses, ordnance offices, and government bureaus. Typical of the comments is this one from John May, vice president and general manager of sales, American Steel & Wire Co.:

> **The NE Steel Handbook and NE Steel Selector are beautifully gotten up and I know from experience that they will be very useful to many steel buyers.**

The Handbook and Selector, as a set, sell for $1.00. Address your order to Readers Service Department, Penton Building, Cleveland.

Bootlegging Decline

■ Our Washington undercover man reports that agents of the Bureau of Internal Revenue seized 11,372 illicit stills in the fiscal year 1942, most of which were crude affairs consisting mainly of an old Ford radiator and a few tubs. However, they say this does not reflect the bootlegging situation in the country today because since the end of said fiscal year there has been the sharpest decline since the repeal of prohibition. The reason is simple. The bootlegger can't get sugar, just as you and ourselves, and without sugar he has to go back to the old, slow process of making corn, and that proves too expensive and prevents production in volume.

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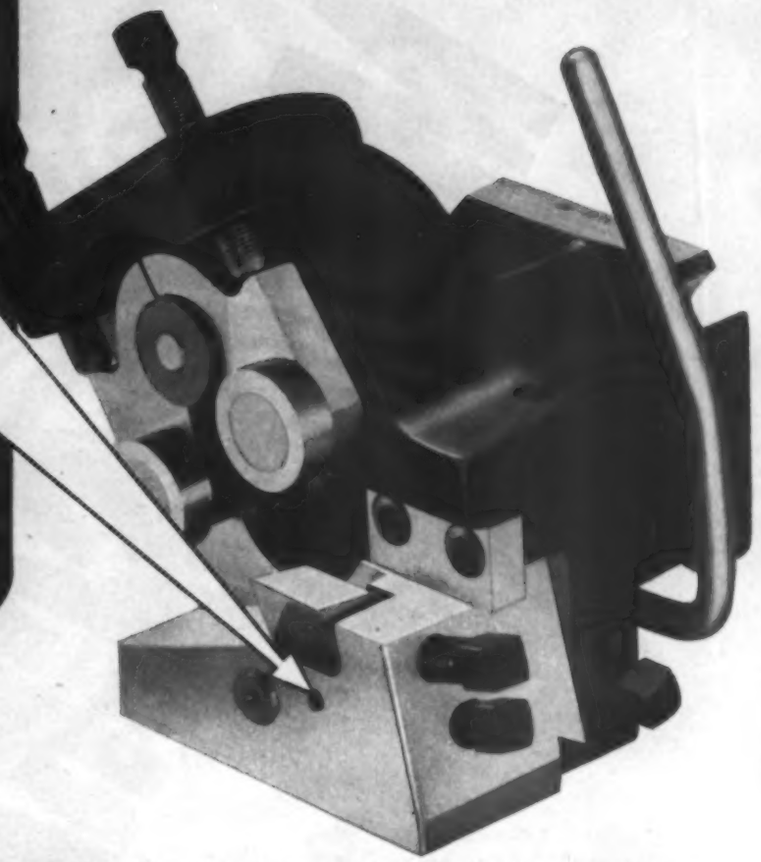
"BROTHER, THAT HOLE ISN'T THERE JUST FOR DECORATION!"



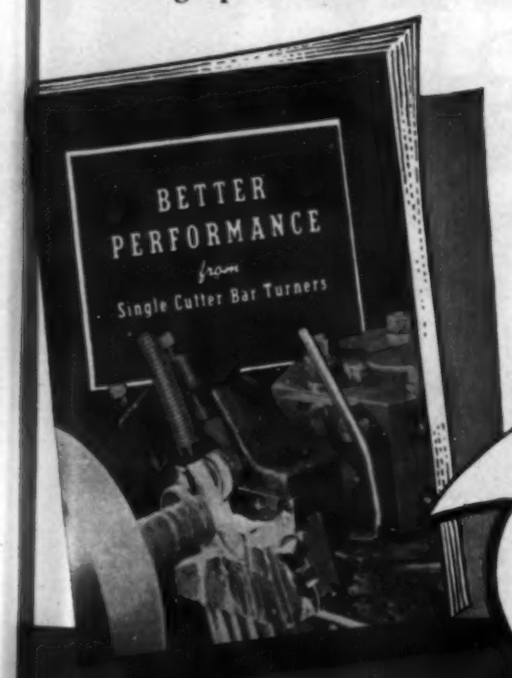
FIELD STUDIES in scores of plants have shown an urgent need for a more thorough understanding of the Single Cutter Bar Turner. For example, we found operators—experienced operators—having difficulty in positioning cutters of varying thickness in the cutter slot. The remedy is simple—a hollow set screw wrench used through the hole in the front of the block permits easy adjustment of a screw for backing up the cutter.

KNOW THE FULL POSSIBILITIES OF THIS BASIC TOOL IN BAR TURNING

THE Warner & Swasey Single Cutter Bar Turner is used more than any other tool in turret lathe setup for bar work. It is designed and built to hold close limits and deliver fine finishes under fast production. When undersized or oversized diameters occur or "barber-pole" finishes appear, invariably they can be corrected by an operator who knows how to adjust and use the tool.

To give operators a thorough knowledge of a tool they use most often and to provide definite helpful hints that will result in better bar performance, we have compiled a 32-page booklet, full of illustrations and diagrams. It will be sent on request.

WARNER & SWASEY
Turret Lathes
Cleveland



New Single Cutter Bar Turner Manual Points Many Ways to Increased Production

TO GET YOUR COPY, MAIL COUPON **NOW**

Warner & Swasey Operator's Service Bureau, Cleveland, Ohio
Please send booklet, "Better Performance from Single Cutter Bar Turners".

Name _____

Address _____

City _____ State _____

ST-12 I work at (Company) _____

YOU CAN TURN IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

MORE SCRAP means

more steel

The more scrap the steel producers get, the more steel they can turn out. Every pound of scrap you have should be turned over to your Scrap Dealer. He will rush it to the steel mills where it will be used to make more steel for our Armed Forces.

Collect your scrap *now* . . . keep it rolling for Victory.

WEIRTON STEEL COMPANY—WEIRTON, WEST VIRGINIA

Sales Offices in Principal Cities

division of NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.

With that curtly classic reminder, one of America's most famous research engineers replied to a man in the act of rhapsodising about the wonderful ingenuity of man.

For the barnacle, he pointed out, is a symbol of all those things that have *not* been done – a tiny marine organism that costs us millions every year – simple, "impossible" things that are still to be accomplished.

The development of lighter and stronger alloys, permitting 3, 5, or even 10 horsepower for every pound of engine weight, instead of one-to-one . . . cheaper color photographs and faster engravings and better television . . . swifter ways of making and working new super-hard alloys . . . scores of different kinds of rubber "growing" on factory floors, and fuels 3 or 4 times as powerful as 100-octane gasoline . . . even solar energy, and atomic power, and – remember the barnacle! These are but a few from a list of certainties and possibilities as long as man's imagination.

Under the secrecy of forced-draught war research, many incredible accomplishments – seemingly impossible within our time – have already occurred. For obvious reasons, these may not be discussed, but of one thing we can be certain: The end of this war will inaugurate the greatest era of industrial surprises since the age of machinery began.

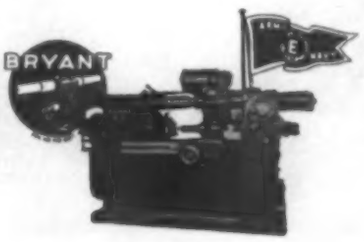
And the shift to light metals and plastics may be as consequential as the shift from bronze to iron!

We at Bryant have developed many new techniques during the past few months. Our engineers are working on hundreds of production lines today, helping to solve production problems involving the machinery of hard rubber, plastics, glass, graphite, cast iron and bronze, as well as forged, centrifugally cast and surface-hardened steels, light metals and alloys from a hundred new specifications.

If this wealth of new experience can be of value to your business, it's there for the asking. For Bryant's Consulting Service on internal grinding is available to you at all times.

Call upon us now!

SEND FOR THE MAN FROM BRYANT



Bryant Chucking Grinder Company

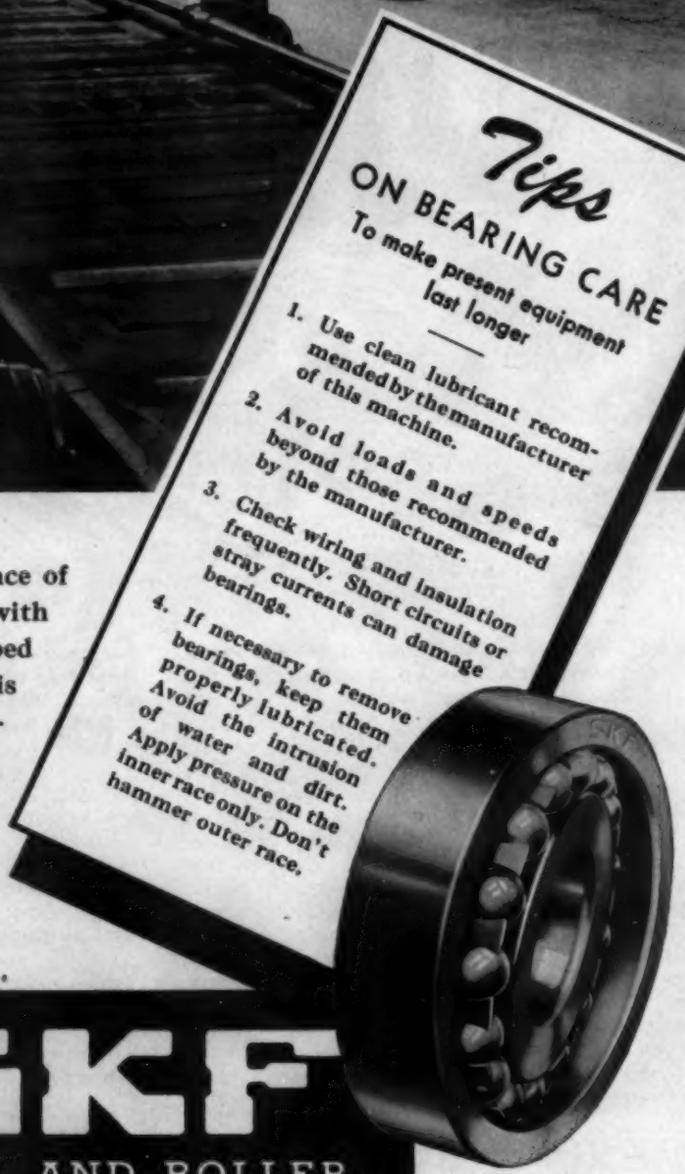
SPRINGFIELD, VERMONT, U. S. A.

Hot Strip Mills

ARE LICKING THE AXIS

• SKF -equipped motors driving runout table in 54" hot strip mill of The Youngstown Sheet & Tube Co.

North and South—America's preponderance of hot strip mills are punching the Axis with stepped-up production from SKF-equipped machinery. One of the most modern is this Youngstown Sheet & Tube Company's 54-inch hot strip mill where SKF-equipped motors drive runout table rollers that speed "hot rolled" to its destination. Where tonnage is the thing that counts, SKF's help move steel at topmost speeds. 5295


Tips
ON BEARING CARE
To make present equipment last longer
1. Use clean lubricant recommended by the manufacturer of this machine.
2. Avoid loads and speeds beyond those recommended by the manufacturer.
3. Check wiring and insulation frequently. Short circuits or stray currents can damage bearings.
4. If necessary to remove bearings, keep them properly lubricated. Avoid the intrusion of water and dirt. Apply pressure on the inner race only. Don't hammer outer race.

ARMY E NAVY

SKF
BALL AND ROLLER
BEARINGS

SKF INDUSTRIES, INC., PHILA., PA.

ARMOR-VIT

A NEW AND REVOLUTIONARY DEVELOPMENT IN *METAL FINISHES*

Here is a priority-free finish that is highly resistant to rust, corrosion, heat, impact, abrasion, scratch, acids and alkalis. It can be applied to practically any metal product by spraying, then cured through a heat cycle of from 250° to 700° F. Although ceramic in nature, there is no relationship or comparison between ARMOR-VIT and porcelain enamel, paint, lacquer or synthetic finishes. It is non-volatile and non-explosive. It is undismayed by heat of over 1000° F., and has high resistance to thermal shock. It is unaffected by the standard 200-hour salt spray tests, or accelerated weathering tests equal to over 5 years normal weather. ARMOR-VIT is a coating less than 1/1000th of an inch in thickness. It goes farther and lasts longer.

See that corrugated steel skid-box filled with 37 mm. armor-piercing shot? In one plant where these shot are received for final case-hardening, the ARMOR-VITed skid-box has been toting around those rough shot for eight months. And dumping 37 mm. shot into and out of the skid-boxes (frequently when they are piping hot) is a test for any finish. Here's plant proof that ARMOR-VIT possesses amazing resistance to scratching, abrasion, heat and wear.

Send today for complete information about this entirely new development in the field of protective coatings. Remember: it is a priority-free material. There are accredited ARMOR-VIT applicators convenient to your plant—experienced firms who can accept your product, ARMOR-VIT it, then return it to you in jig time. ARMOR-VIT is a coating that lasts the life of the product. ARMOR-VIT is now available in black, gray, or olive drab.

ARMOR-VIT DIVISION
CHICAGO VITREOUS ENAMEL PRODUCT CO.
CICERO • ILLINOIS

Bolts are important . . . .

—AND YOU CAN'T OPERATE A

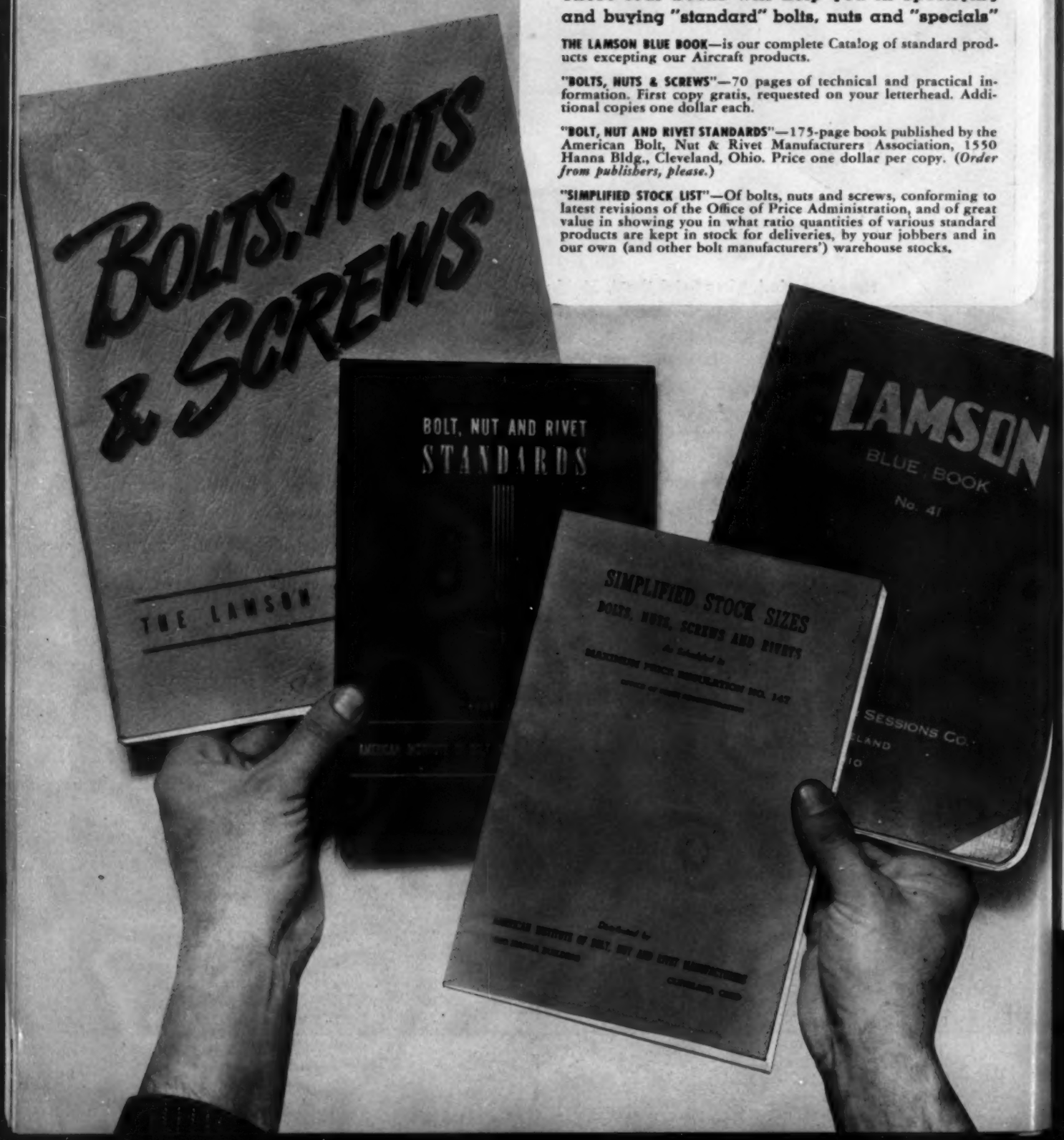
These four books will help you in specifying and buying "standard" bolts, nuts and "specials"

THE LAMSON BLUE BOOK—is our complete Catalog of standard products excepting our Aircraft products.

"BOLTS, NUTS & SCREWS"—70 pages of technical and practical information. First copy gratis, requested on your letterhead. Additional copies one dollar each.

"BOLT, NUT AND RIVET STANDARDS"—175-page book published by the American Bolt, Nut & Rivet Manufacturers Association, 1550 Hanna Bldg., Cleveland, Ohio. Price one dollar per copy. (*Order from publishers, please.*)

"SIMPLIFIED STOCK LIST"—Of bolts, nuts and screws, conforming to latest revisions of the Office of Price Administration, and of great value in showing you in what ratio quantities of various standard products are kept in stock for deliveries, by your jobbers and in our own (and other bolt manufacturers') warehouse stocks.



you can't fight without them

TANK, SHIP OR PLANE WITHOUT THEM

For this reason it is imperative that you know as much as you possibly can about bolts.

You should know how they are made and why some bolts are made much differently than others.

You should know what materials are available today for the bolt manufacturer, which are the critical materials and which one of the NE steels may be substituted to obtain as good a bolt.

You should know the difference between actual bolt strength tables and theoretical bolt strength tables as shown in steel hand-books, for bolt manufacturers' actual experience and engineering research has developed more reliable tables for strength of threaded products.

You should know—and this is extremely important to designers—that you can obtain a standard size and type of bolt from stock that, properly heat treated, will produce higher physicals than a bolt of approximately *twice its weight or size,* thereby saving steel in their making, and requiring a smaller hole in the materials to be bolted.

You should know that a bolt made "special" to your designs requires "special" handling from start to finish in every department of our plants, and reaches you much later *than had you designed to use a standard bolt.*

You should know that all too frequently a "special" bolt required by your designers in good faith may be found by our engineers, working in collaboration with your own, *to be entirely unnecessary.*

All these are somewhat commonplace conditions to our engineers whose sole business is making bolt and nut products.

The first thing to do is to ask our engineers for help—after you have familiarized yourself with the most common bolt manufacturing methods. And this we have made easy for you to do in this way—we have made available our standard Catalog, the Lamson Blue Book, which lists all sizes of standard products excepting aircraft products; and we have made available a book, already well known, with the title, "Bolts, Nuts & Screws," containing valuable reprinted technical articles, well illustrated, some of them written by our own engineers and some by engineers from other manufacturers, all of them authentic. (This book later on will be revised with additional articles, published since its first edition, but the new articles will be available as separate reprints before the book is revised.)

And then there is now available a booklet of vast importance to use in connection with any manufacturer's catalog, the new "Simplified Stock Sizes of Bolts, Nuts, Screws and Rivets," as scheduled in maximum price regulation No. 147 by the Office of Price Administration. This stock list will even be of help to your designers, for it shows relative quantities of standard sizes of bolts kept available *and if they design for standard bolts,* this tells you whether they can obtain them readily from stock.

Finally, there is the "Bolt, Nut and Rivet Standards" book, published by the American Institute of Bolt, Nut & Rivet Manufacturers, invaluable itself, which sells for one dollar.

Here is condensed knowledge, bolt manufacturing and application experience, available to you for the asking. If you are making war materials, directly or indirectly, you know the problems that come up every day due to employment of inexperienced help, skilled or unskilled. A good engineer may lack a knowledge of bolts—have his own work hampered—because of it. Here then is an opportunity to get a lot of practical experience and up-to-date guidance, "in a package." You can depend upon the contributions of our own engineering and production men, when you call them in, because Lamson & Sessions' five plants are operated by men whose organization has over 75 years experience in the bolt business.

Buy U. S. War Bonds and Stamps —an investment in America

THE LAMSON & SESSIONS COMPANY, 1971 W. 85th St., Cleveland, O.

HERE'S A COUPON FOR YOUR CONVENIENCE

The Lamson & Sessions Company
1971 West 85th Street
Cleveland, Ohio

(Please be sure you read directions on opposite page for getting a copy of "Bolt, Nut & Rivet Standards.")

Please send us ☐ Lamson Blue Book; ☐ Bolts, Nuts & Screws; ☐ Simplified Stock Sizes, to the undersigned.

Name of Individual _____ Title or Kind of Work _____

Employed by (Name of Company) _____

Street Address _____

City and State _____

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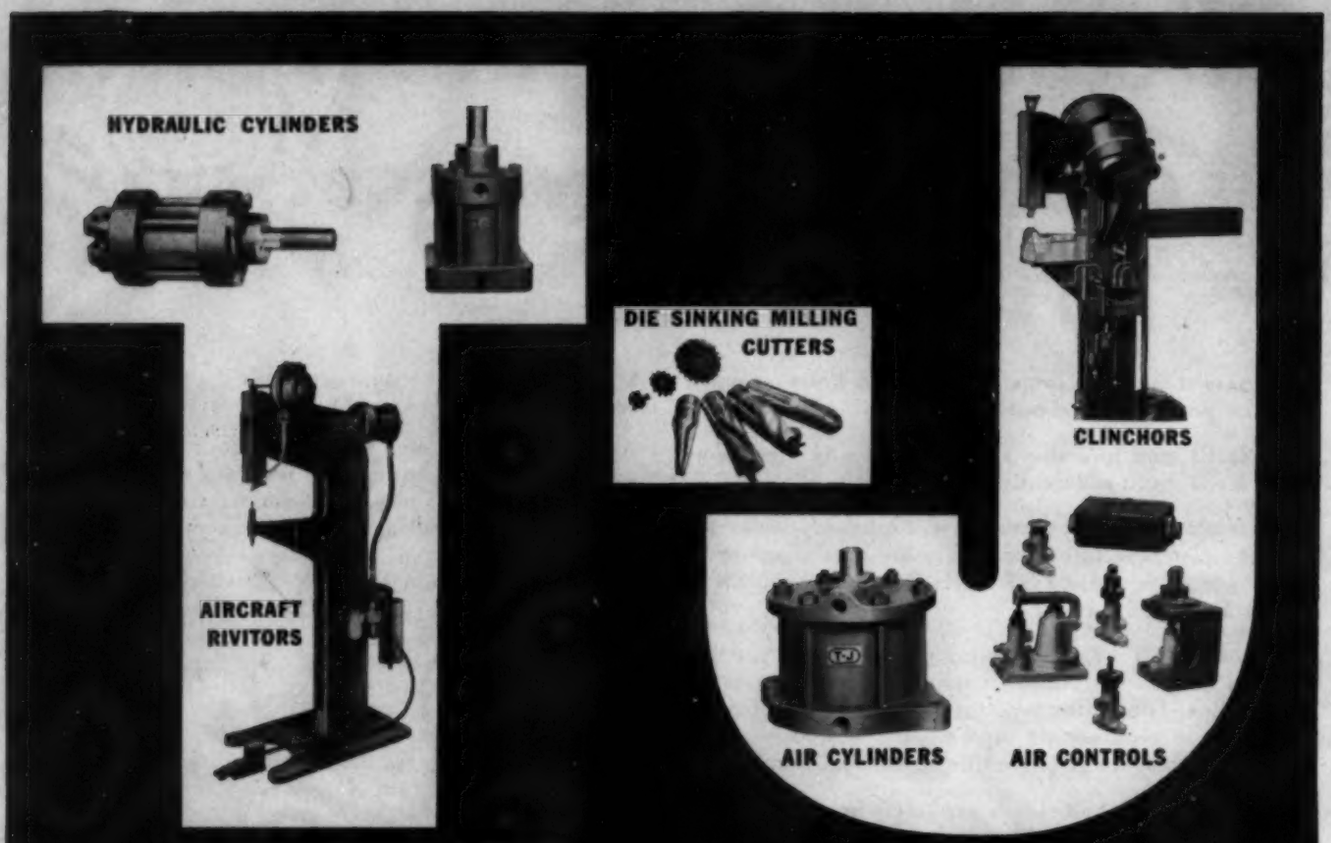
BOLTS · · NUTS · · COTTERS · · CAP SCREWS · · SPECIALS

Your Jobber Stocks the Lamson Line



DESIGNED FOR TOUGH JOBS

Proved "on the firing line" in industry's tough jobs for a quarter century... Tomkins-Johnson products are widely known today for ahead-of-the-times performance!

More and more, men who demand TOP efficiency and accuracy *turn to T-J* for Rivitors... hydraulic cylinders... air cylinders... cutters... Clinchors... and air controls for a wide range of requirements. Precise standards of manufacture... plus careful inspection of all materials... are constantly guarding T-J Quality throughout production.

Our "tomorrow-minded" engineering staff and long experience are continually solving new problems for industry—do not hesitate to bring *your* Tough Jobs to T-J! Write for bulletins. The Tomkins-Johnson Co., Jackson, Michigan.

T-J

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

Hitching power to a Star

AIRCRAFT NUTS CLEANED BETTER AT HALF THE COST WITH PENNSALT CLEANER

A New England manufacturer of parts for aircraft had a real problem in getting nuts free of oil and chips. The washing machine in use was of the rotary type with scoop action. A solvent cleaner was being used but it did not get the nut threads clean of very small chips. When the Penn Salt technician called, the manufacturer was trying another type of cleaner in connection with the solvent, but it showed no improvement.

The first Pennsalt product recommended did a thorough cleaning job, removing both the oil and the chips. After a long period of continuous operation, cleaning results were still excellent and a comparison of costs showed a saving of 50% in favor of the Pennsalt cleaner.

It is possible that one of this famous family of cleaners can do as well—or better—for you. Our technical representatives will be glad to cooperate with you on any cleaning problem which you may have. No obligation whatever—and you will get the benefit of experience that covers the entire cleaning field. Write fully to Dept. S.

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals
1000 Widener Building, Philadelphia, Pa.
New York • Chicago • St. Louis • Pittsburgh • Wyandotte • Tacoma

The Right Start in Life!

THIS armature is ready to go out into the world and do credit to its maker. It will serve faithfully—get along smoothly with other parts. It will "wear well" because it has that all-important attribute: *balance!*

To eliminate vibration, to protect bearings, and to assure long life, accurate static and dynamic balance are so vital that no high speed rotating part is ready to start life without them.

GISHOLT MACHINE COMPANY
1217 E. Washington Ave., Madison, Wis.

DYNETRIC BALANCING MACHINES
use the electron tube and stroboglow lamp to locate and measure unbalance more quickly and accurately than it has ever been done before. Dynetric Balancing Machines enable you to put this important work on a low-cost production basis.
Literature on request.

LOOK AHEAD... KEEP AHEAD... WITH GISHOLT IMPROVEMENTS

The Army-Navy "E" and the Treasury Flag fly side by side at Gisholt.

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

HEY JOE...KEEP THOSE TIPS CLEAN...
YOU WILL SAVE OXYGEN AND MAKE BETTER CUTS...

Carbon and slag, clinging to cutting tip orifices, are pseudo fifth columnists — they waste oxygen and acetylene, they slow production, they impair quality of cuts. Such tips nullify the value of using proper gas pressures and cutting speeds.

Be sure your men keep every active tip clean. Keep cleaning drills handy, see that they are used often. In this way you can help get the most out of every cubic foot of oxygen. Let's each one of us be his own Waste Warden. By so doing we can speed final victory.

THE WASTE WARDEN says:
"RETURN EMPTY CYLINDERS PROMPTLY"

DO close cylinder valve after use.
DO check hose and connections for leaks.
DO keep your cylinder inventory low.

* * *

DON'T use excessive pressures or oversize tips.
DON'T leave torch burning when not in use.
DON'T abuse cylinders.

Free copies of this poster available.

AIR REDUCTION

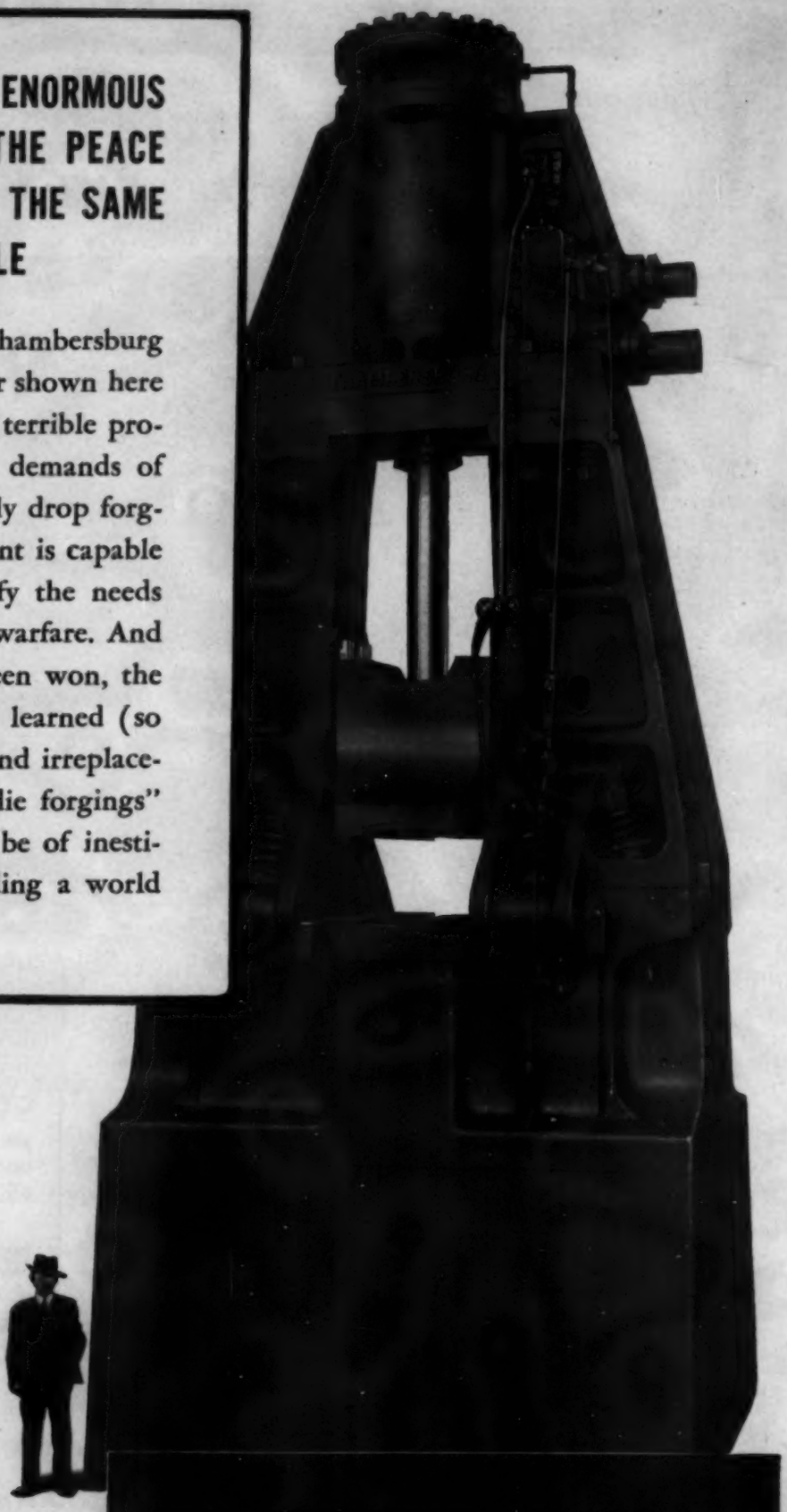
AIRCO

60 EAST 42nd STREET, NEW YORK, N. Y.
In Texas: Magnolia-Airco Gas Products Co.

IDLE CYLINDERS ARE PRODUCTION SLACKERS: KEEP 'EM ROLLING FOR VICTORY!

THIS IS A WAR OF ENORMOUS PROPORTIONS....THE PEACE MUST BE BUILT ON THE SAME TREMENDOUS SCALE

The size of the huge Chambersburg Steam Drop Hammer shown here is an indication of the terrible proportions to which the demands of War have attained. Only drop forgings of the size this giant is capable of producing can satisfy the needs of today's mechanized warfare. And when the Peace has been won, the lessons that have been learned (so slowly) of the unique and irreplaceable value of "impact die forgings" — drop forgings — will be of inestimable value in rebuilding a world of freed men.



A 35,000 lb. Chambersburg Model E Steam Drop Hammer

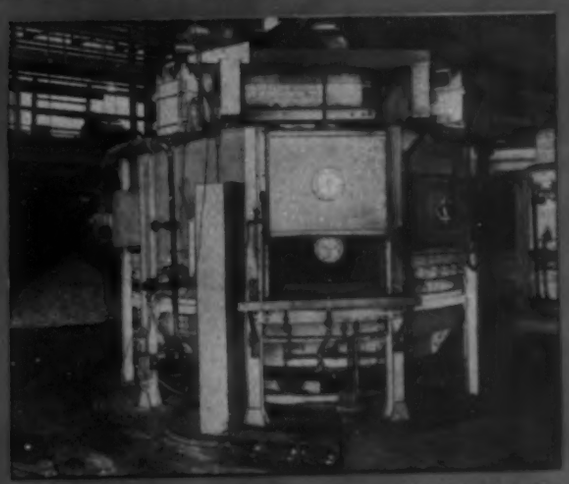
CHAMBERSBURG
ENGINEERING COMPANY
CHAMBERSBURG · · · PENNA.

CHAMBERSBURG
HAMMERS · CECOSTAMPS · PRESSES

HAGAN

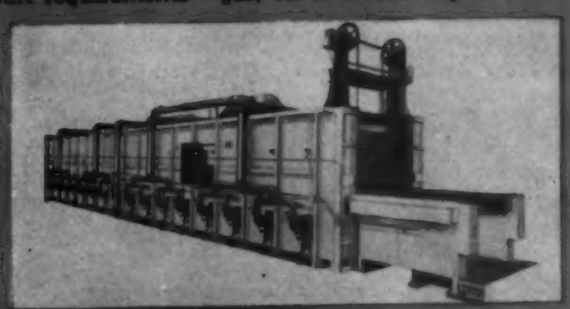
DESIGNERS *and* BUILDERS

OF A COMPLETE LINE OF GAS, OIL AND ELECTRICALLY HEATED FURNACES FOR EVERY INDUSTRIAL APPLICATION



Rotary Hearth Forging Furnaces are available in 4'—5'—7'—9'—11' 6"—14'—17'—20' and 25' hearth diameters. Capacities 600 to 20,000 lbs. per hour. Oil or gas heated.

Car Bottom Furnaces for stress relieving, annealing and normalizing. 4 to 14 feet in width with length and height to suit requirements—gas, oil or electrically heated.



Pusher Type Furnaces designed for continuous heat treating operations. Full range of capacities and chamber sizes—gas, oil or electrically heated.

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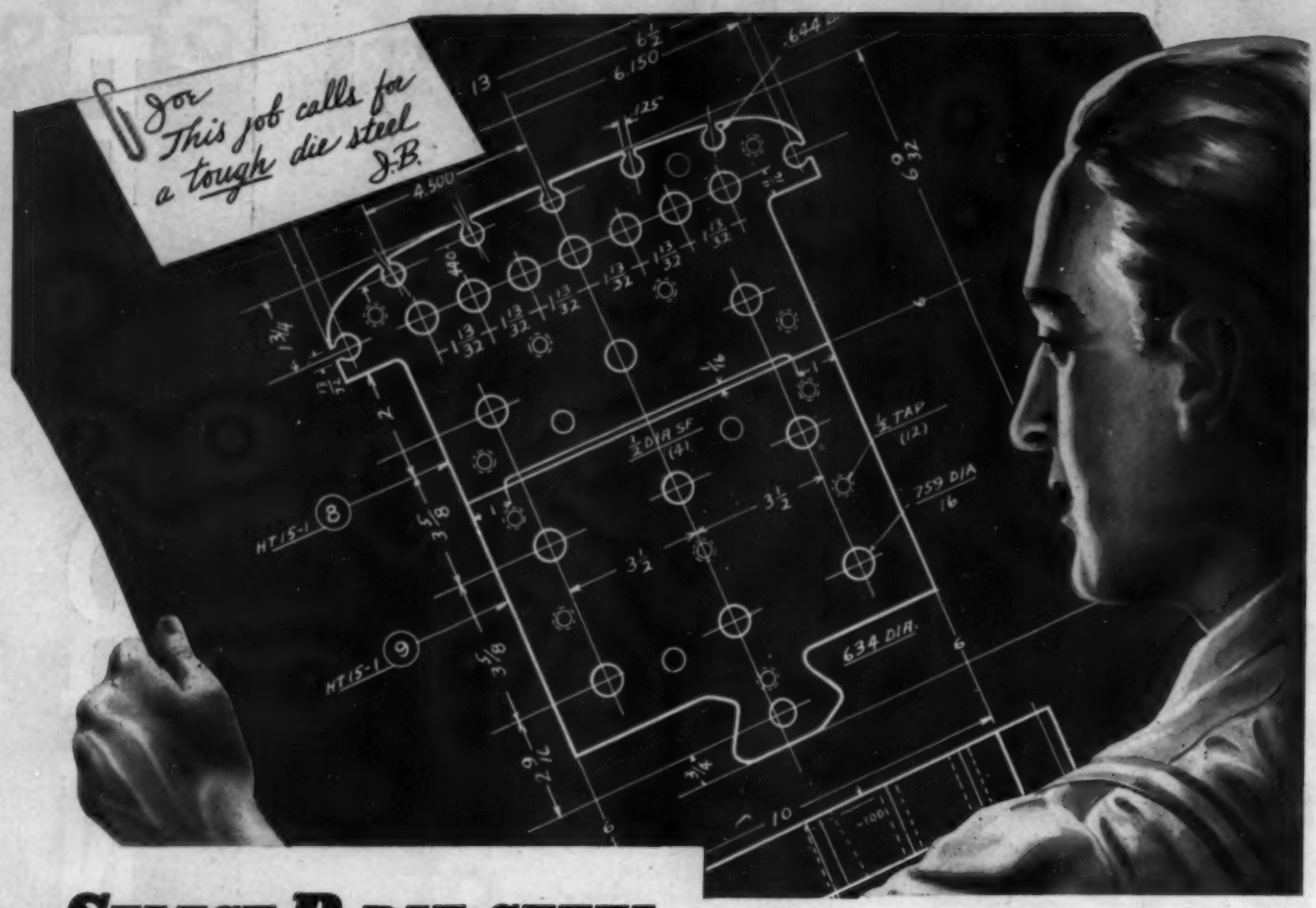
FURNACES



SELECT B DIE STEEL
... for toughness

"My problem is simply this: I have to choose a die steel that is tough and yet withstands considerable abrasion." So said a perplexed die shop superintendent recently to our metallurgical service man. "And don't forget," he added, "it has to machine easily, must be non-deforming and can't be ground after hardening — so the die must be free from scale or decarburization after heat treatment."

"Well, here is the answer," said the Latrobe Metallurgical Service Man. "It's *Select B* . . . a tough die steel that won't deform and will withstand abrasion. As far as heat treating, that is easy: Pack the die in sifted grey cast iron chips, dry charcoal or spent carburizing compound. Cast iron chips will prove preferable, since they won't build up carbon and cause brittleness of cutting edges.

"Since the dies are of a rather intricate nature, preheat at about 1400°F. As soon as they have become heated to this temperature bring furnace up to 1750–1775°F. Hold for just sufficient time for the container to become thoroughly heated, then remove the part and air cool in still air.

"When you can just about pick the dies up with your bare hand draw them at 900°F. The thickness being about 2½", hold for about four hours at this temperature. This will give a hardness of about Rockwell C-58 with the necessary toughness."

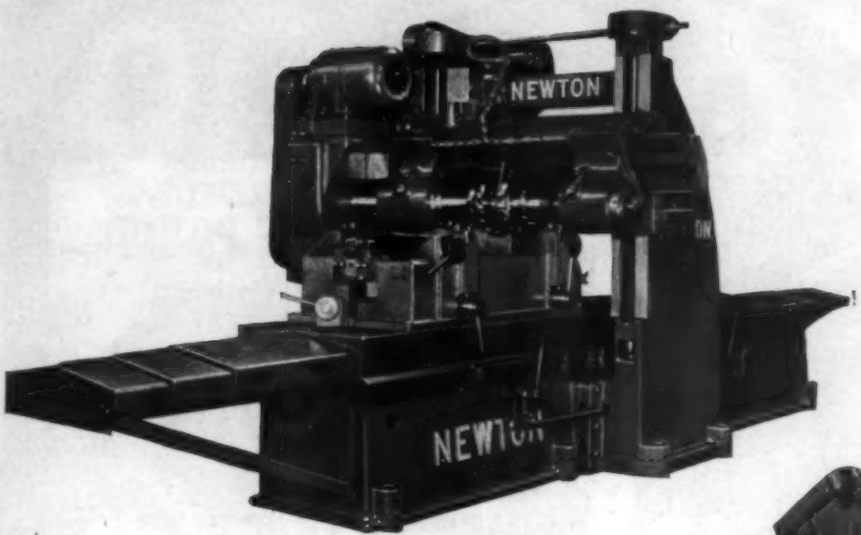
The result: This Company greatly simplified their die machinery problems, the production was increased and a substantial saving in their die steel costs was secured. It's a simple illustration of the timely help you can get to meet today's vital production problems with Latrobe Metallurgical Service. It's a technical help you can feel free to use. A special bulletin on "Select B" is available.

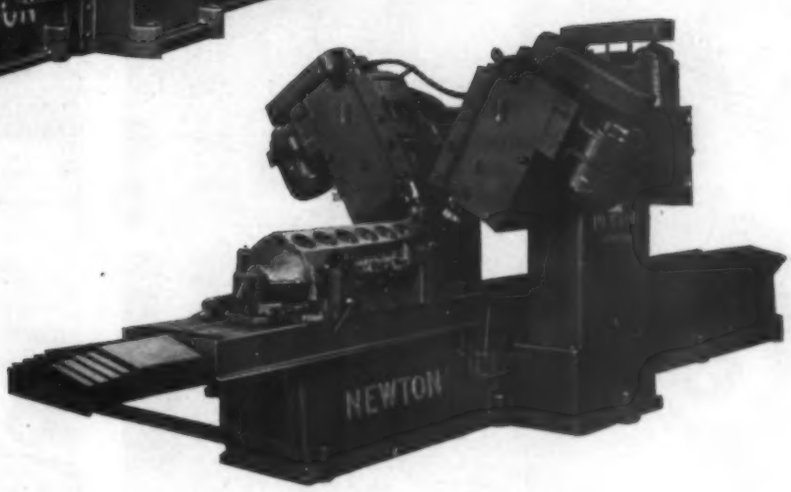
LESCO

TOOL STEELS FOR VICTORY

LATROBE
ELECTRIC STEEL COMPANY
MAIN OFFICES and PLANT — LATROBE • PA.

Are you machining
ALUMINUM or ALUMINUM ALLOYS?





These NEWTON Milling Machines are designed for milling cast aluminum or aluminum alloys.

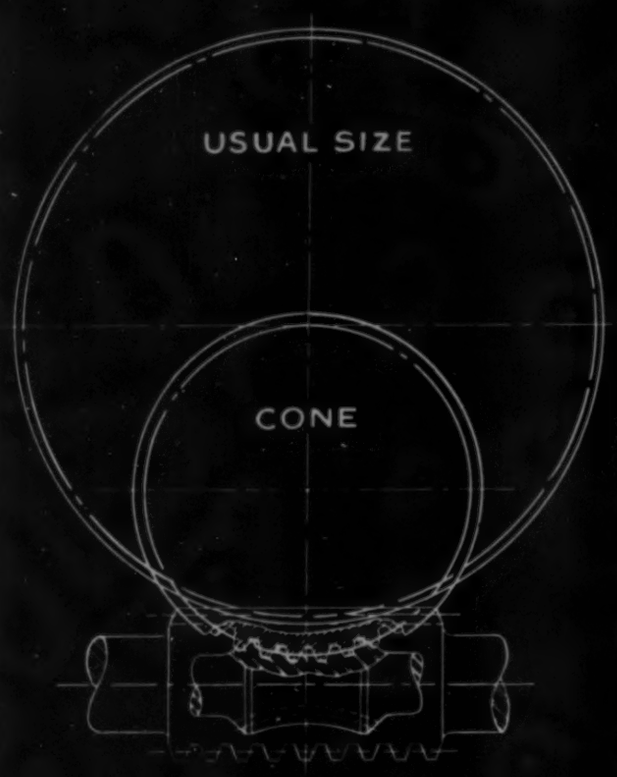
Planer Type Machines with two, three, or four unit heads for milling plain surfaces at any angle.

Horizontal Millers for slab milling or for channeling.

Write us if you are interested.

BETTS • BETTS-BRIDGEFORD • NEWTON • COLBURN • HILLES & JONES • MODERN

CONSOLIDATED
MACHINE TOOL CORPORATION
ROCHESTER, NEW YORK



Comparison of a typical Cone-Drive with a worm gear set of the same load capacity.

LET'S MAKE ONE POUND DO THE WORK OF THREE

One pound of gear steel or bronze CAN be made to do the work of as much as three pounds.

In gears, the amount of metal needed depends primarily on the size necessary to take care of the load to be transmitted.

But the load capacity also varies with the type of gearing used: The greater the tooth contact, the larger the number of teeth in contact, the greater the load the gear can carry.

That's why Cone-Drives save so much weight. In Cone-Drives you have up to 30 times the normal contact area. That means you can safely reduce gear dimensions by as much as one-third or more and still get the same load capacity.

That one-third reduction in size means a saving of as much as two-thirds of the gear weight.★

Conservation is vital. We can help you get more gears per pound. Write or wire today for a manual on Cone-Drive gearing.★★

★Plus the savings due to smaller housings, etc.

★★For Design Engineers CW-41-A
For Executives CW-41-B

CONE-DRIVE DIVISION MICHIGAN TOOL COMPANY

HOW METAL CHILLING KEEPS THE *Accuracy* IN PRECISION GAGE BLOCKS

COMPLETE STABILIZATION OBTAINED IN BLOCKS BY TREATING IN DEEPFREEZE —120° CASCADE CHILLING UNIT . . . . .

A prominent manufacturer of precision gage blocks was able to minimize expansion and warping of the blocks by chilling in a Deepfreeze —120° Cascade Industrial Chilling Unit. Deepfreeze sub-zero temperature is used to stabilize the blocks and maintain maximum Rockwell hardness by eliminating elevated drawing temperature after quenching and securing stress relief by bringing the blocks from room temperature to —120° F. six times during the final finishing operations. This complete stabilization eliminates costly metal growth and warp by holding the finished size under all normal temperature changes and handling.

Deepfreeze also used to speed manufacture of gages . . .

Heretofore the flatness of the lapping blocks used in the manufacture of these gage blocks was subject to a time distortion due to the release of strains and "ageing" of the metal which made it necessary to resurface them every two or three hours. Now by stabilizing through chilling in the Deepfreeze, the plates retain their accuracy for two or three days...or *2000%* increase in number of blocks lapped between resurfacing of lapping plates.

DATA AND PART INFORMATION

REQUIREMENTS...
Stabilize precision gage blocks. Also to stabilize lapping plates and face plates.

FORMER METHOD...
Formerly used dry ice, but could not obtain uniform results. Dry ice costly and difficult to use.

DEEPFREEZE METHOD...
Gage blocks were chilled in Deepfreeze Cascade Unit at —120° F. six times during final finishing operations. Chilled 4½ to 5 hours in Deepfreeze—1½ to 2 hours to bring to room temperature.

RESULTS...
Complete stabilization of blocks, eliminating costly metal growth and warp. Also lapping plates now hold accuracy for two or three days.

HOW YOU CAN USE DEEPFREEZE

In addition to preventing the growth or warp in gages and precision parts, Deepfreeze metal chilling can help you in: (1) The Shrinking of Metals for Expansion Fit (2) Treating of Tool Steel (3) Storage of Annealed Aluminum Alloy Metals (4) Testing of Aircraft Instruments and Materials. Deepfreeze Engineers are available to assist you in these and other metal chilling applications to your products. Send for preliminary calculation and test—no obligation.

FREE BULLETIN
describing Deepfreeze Units with complete details and specifications, and listing other uses. Send for copy today.

Deepfreeze
DIVISION

MOTOR PRODUCTS CORPORATION
2309 DAVIS ST., NORTH CHICAGO, ILLINOIS

Official photos by U. S. Army Signal Corps and U. S. Marine Corps.

EVER hear of U·S·S Air-Dek? It's that new steel landing mat, developed by United States Steel research to meet the requirements of U. S. Army Air and Engineer Corps. This "magic carpet" is made up of hundreds of lightweight perforated steel sections that lock together. One company of soldiers can assemble and lay it in a short time, transforming a sandy beach or a lush tropical clearing into a full-fledged airfield ... just like that! This invention is one reason why our air forces can establish strategic air bases *fast*.

Numerous metal-working plants are producing U·S·S Air-Dek—among them makers of office furniture, railroad specialties, culverts, stampings, steel buildings, stoves and furnaces, and metal burial vaults. Much of the manufacturing equipment formerly used to shape peacetime products has been adapted to the high-speed production of steel landing mat sections.

Today, the mounting production of U·S·S Air-Dek by many industries is a great military asset. Future commercial and private flying should benefit also from this unique product. It would provide practical and quickly built flight strips or other landing facilities for remote and inaccessible locations.

U·S·S STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Supply Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

WITH A PLYMOUTH . . .

BANG GOES THE BOTTLENECK

PHOTO BY COURTESY OF WORLD'S LARGEST BUILDER OF MOTOR BOATS

PILE on a Plymouth Locomotive all the adverse conditions that come with war time super-scheduling . . . massive mounds of material to be moved, heavy loads, long hours, bad weather . . . and see how this 24-hour-a-day, 7-day-a-week untiring worker buckles down and goes to work—for you. Delays are dangerous to the war effort . . . an hour *here* is a lifetime over *there*.

Let Plymouth performance tackle your haulage problems . . . bring you relief from materials handling and transportation worries. Plymouth Locomotives are fast, economical, efficient . . . gasoline or diesel powered . . . 2½ to 70 tons.

TRACK HAULAGE IS CHEAPER HAULAGE

PLYMOUTH LOCOMOTIVE WORKS, Division of THE FATE-ROOT-HEATH CO., Plymouth, Ohio

PLYMOUTH *Flexomotive*

DOLLAR FOR DOLLAR——————THE GREATEST LOCOMOTIVE EVER BUILT

Weather-Tested

against { HEAT

MOISTURE

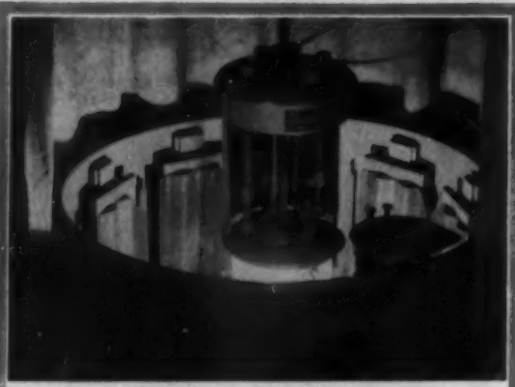
COLD

ACID FUMES

APS

ROOFING • SIDING • FLASHINGS

The wide acceptance of A P S Roofing, Siding and Flashings is indicated by the number of outstanding industrial buildings recently erected for use



WEATHER-TESTED FOR EXTREMES—Here, in the Weather-Ometer, A P S panels were exposed to arc-light at temperatures up to 140°F., and then tested in cold-box at 10°F. below zero!

Available NOW!
for MAINTENANCE and REPAIRS
...as well as new construction

A P S Sheets are manufactured by a carefully controlled process in which the heated sheet is coated with a molten plastic compound and impregnated with mica for added protection.

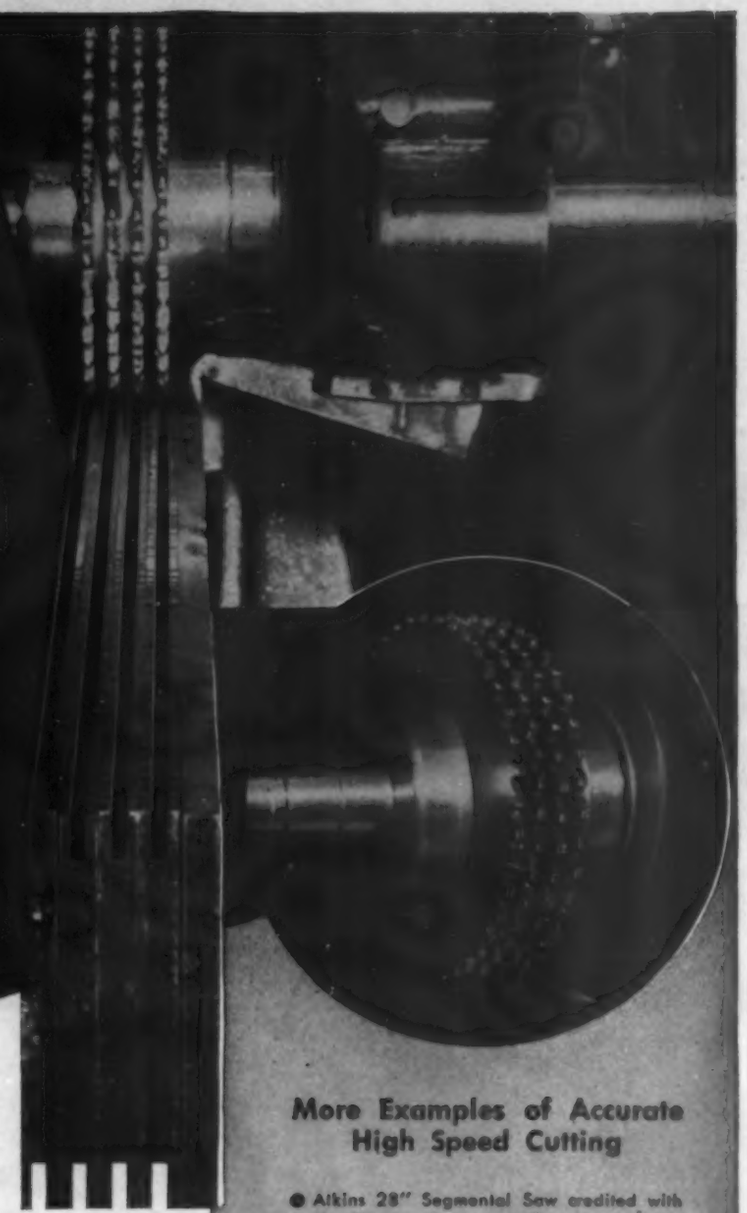
A P S Sheets are available through your local jobber

1. **Steel protects the structure**
2. **Weather-Tested compound protects the steel**
3. **Mica protects and reinforces the Weather-Tested compound**

PROTECTED STEEL PRODUCTS CO.
General Office and Plant, WASHINGTON, PA.

ATKINS *Curled Chip* SAWS

Accurate Gang Sawing Speeds Production by Cutting 204" in 8 Hours



● Here is an example of high speed, accurate gang sawing you will recognize as way above average. Four Atkins Curled-Chip Milling Saws, operated in a gang as shown, were cutting ⅜-inch deep, ⅛-inch wide slots in steel plates. The saws were 5-inch diameter, operated at 32 RPM spindle speed, 42 FPM peripheral rim speed. The material cut was SAE 1090 22 Rockwell (and that's plenty hard). Yet these saws cut at the rate of 204" in 8 hours—a truly remarkable record, on work requiring utmost cutting accuracy.

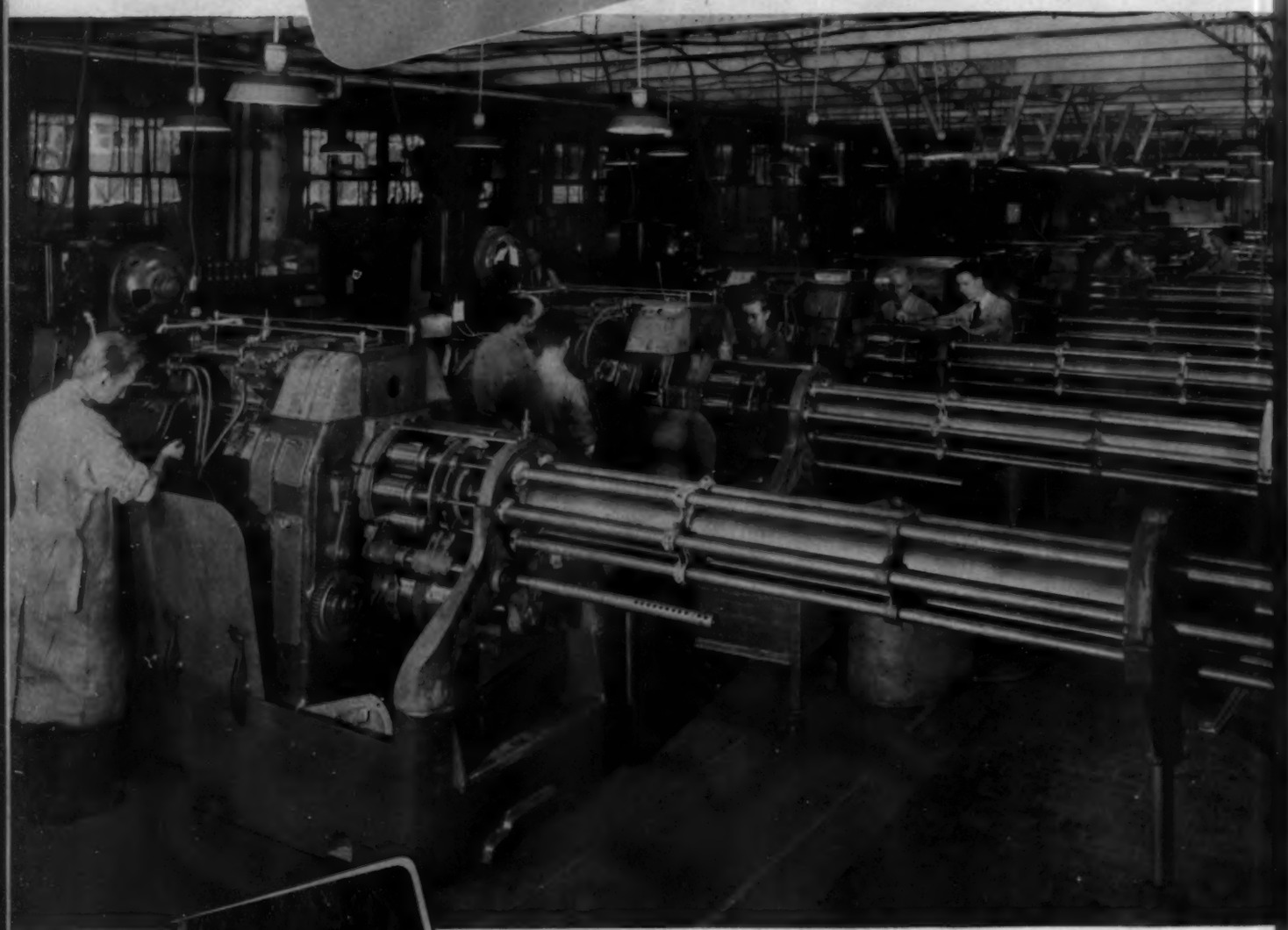
Our file of performance data on the great cutting capacity and long cutting life of Atkins Curled-Chip Saws is growing daily. It offers convincing proof that the Atkins Curled-Chip System (including Milling Saws, Segmental Saws, Powersaw Blades and Band Saws) is today's most practical way of getting work out fast and efficiently. Write for these data today.

More Examples of Accurate High Speed Cutting

- Atkins 28" Segmental Saw credited with startling performance of approximately 7 seconds the cut on 8" Round Bronze Billets.
- **650% More Production**—Sawing 40 mm. burr-free shell bands at 1 each second with an 8" Curled-Chip Saw instead of 4 every 30 seconds on a screw machine.
- 860 Brass Slabs, 15½" x 4½", 59,985 sq. in. cut between sharpenings by Atkins 30" Segmental Saw.
- Atkins 28" Segmental Saw records 27 seconds per cut on 77 mm. stock.
- **Production 45 Times Faster**—A whirlwind reduction in cutting time on 2½" Electric Cast Steel—7½ minutes to 10 seconds is the achievement of Atkins new 6" Curled-Chip Milling Saw.

E. C. ATKINS and COMPANY

IF BESSEMER STEEL MEETS YOUR NEEDS



ARE YOU USING YOUR STEEL HANDBOOK NO. 42 TO HELP LICK "TOO LITTLE—TOO LATE"?

Thousands of copies of this gold mine of steel and machining information have been placed in the hands of machine tool users. In it is a vast amount of helpful information prepared to help you obtain maximum efficiency and a high percentage of perfect parts at lowest cost. Use your copy and its data on steel analyses, physical properties, heat treatment, recommended speeds and feeds for standard tools, spindle speeds, weight and area tables, stock estimating tables and other helps. If you do not have a copy and you are engaged in the machining of steel, write us for one.

Union Free Cut WILL HELP KEEP WAR PRODUCTION CURVES UP

Here's a Bessemer Screw Steel that keeps "automatics" running with a steady hum — day in and day out. Its consistent machining performance produces a steady stream of finished steel parts — at a rate of output which can be depended upon to keep war production curves up to the high levels so essential today.

UNION FREE CUT is an *ADVANCED* Bessemer Screw Steel — advanced by improvement after improvement resulting from more than half a century of machining research in laboratory and in parts producers' plants. It machines uniformly, bar after bar and shipment after shipment, with a fine, broken-up chip — produces a bright, smooth, machined surface.

Through reduction of abrasive elements that wear cutting edges, tool life has been substantially increased. Structure is uniform, as also are cyaniding or carburizing qualities which produce a hard, wear-resisting surface.

If your specifications can be met by the physicals of A.I.S.I. B1112 (S.A.E. 1112), you can achieve *and sustain* high production efficiency in the mass production of steel parts by using UNION FREE CUT.

If your equipment is capable of higher speeds, your selection probably will be UNION SUPERCUT (A. I. S. I. B 1113 — S. A. E. 1113) — the fastest-machining Bessemer Screw Steel made today. It provides the uniformity of machinability, fine machined finish and freedom from abrasive elements of UNION FREE CUT plus an increase in cutting speed to approximately 225 surface feet per minute.

Should your requirements, however, require the higher strength and the toughness of open-hearth or electric furnace analyses, you will find the same uniformity of properties, especially machinability, in these UNION COLD DRAWN STEELS.

Republic UNION COLD DRAWN STEELS are processed to provide the highest degree of machinability for each analysis. And Union Drawn metallurgists and engineers are ready to help you solve vexing machining and heat treating problems.

REPUBLIC STEEL CORPORATION
Union Drawn Steel Division
Sales Offices: Massillon, Ohio
GENERAL OFFICES • • CLEVELAND, OHIO
Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Truscon Steel Company
Export Department: Chrysler Building, New York, New York

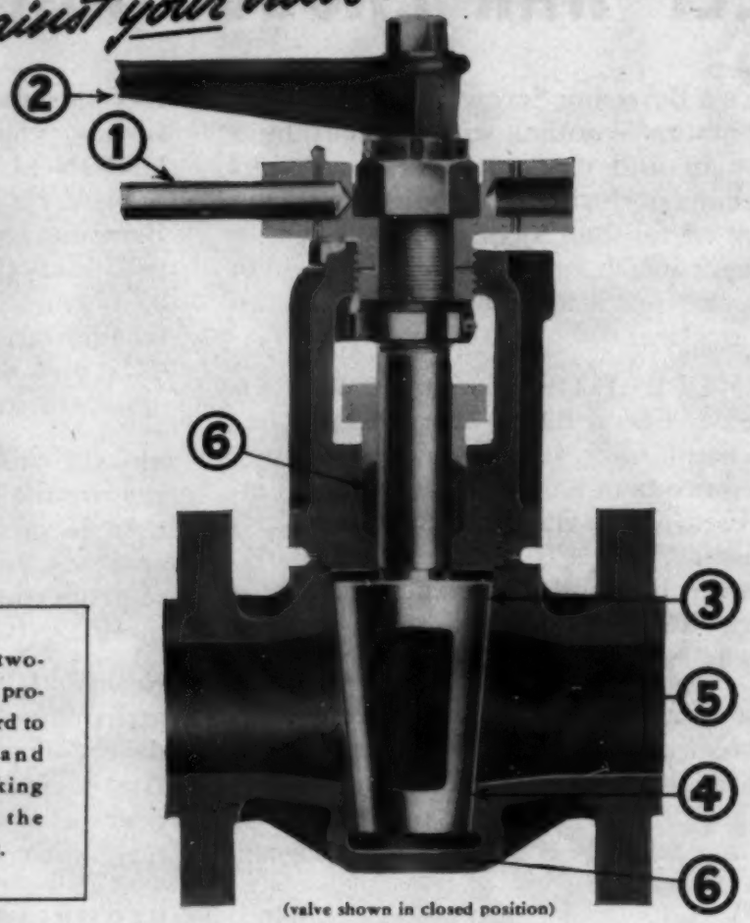
Republic

UNION COLD DRAWN STEELS

Free-Machining Bessemer, Open-Hearth and Electric Furnace Steels
•
Union Cold Drawn Special Sections
•
Union Cold Drawn and Ground Rounds; Turned and Polished Rounds; and Turned, Ground and Polished Rounds (Union Precision Shafting).

What it takes . . . they've GOT!

Prove it by Checking these HOMESTEAD LEVER-SEALD features against your valve needs!



(valve shown in closed position)

Maritime's two-flag, highest production award to our men and women making valves for the Victory Fleet.

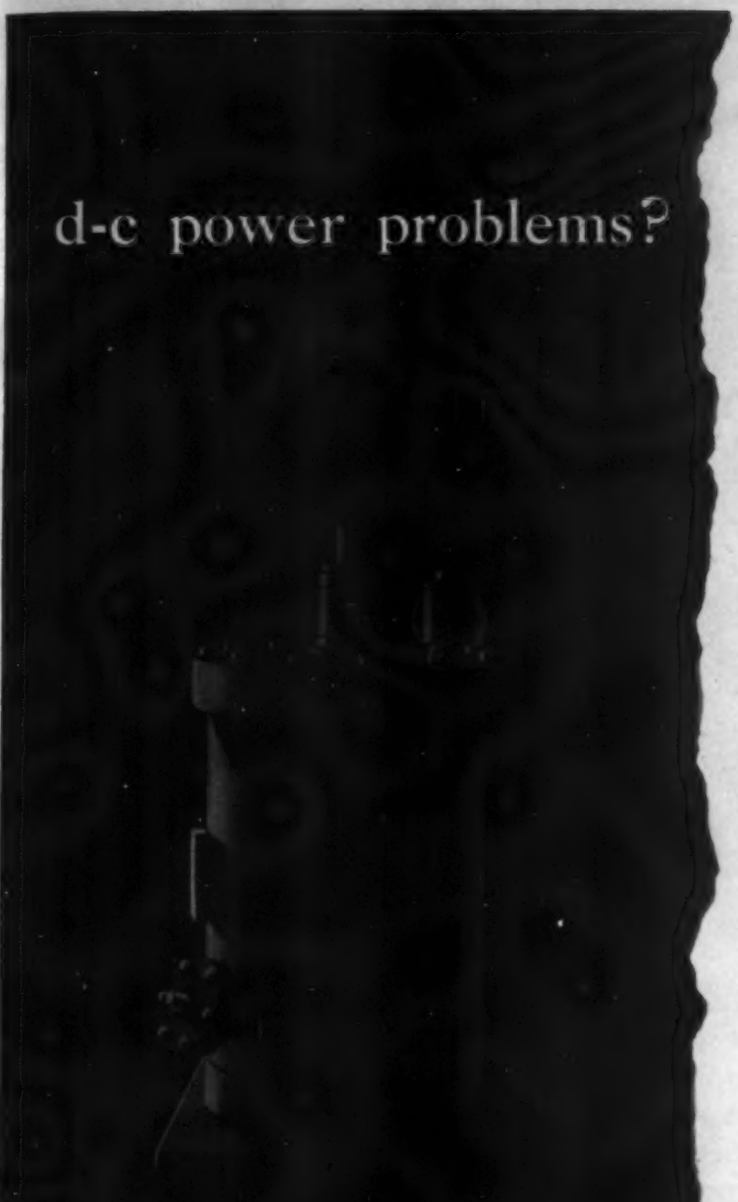
1. **Instant stick-proof operation.** — Built into this valve is a powerful lever and screw which relieves seating pressure between plug and body just enough to overcome friction and permit easy turning under any condition.
2. **Quarter-turn fully opens or closes.** — After seating pressure has been relieved by the lower handle, a quarter turn of the upper handle fully opens or closes the valve.
3. **Positive seal without lubrication.** — After opening or closing, full seating pressure is always re-applied by the lower lever to make a positive, leakless seal without need of any lubricant.
4. **Seating surfaces always protected.** — Since the plug is never really unseated (only relieved of pressure) the seating surfaces are protected from injurious matter in all positions for longer, leak-proof service.
5. **Unobstructed straight-line fluid flow.** — Minimum pressure drop results from straight-through flow and unobstructed passage of fluid.
6. **Outside leakage prevented.** — Leakage of fluid to the outside of the valve is prevented by a sealed bottom and extra deep stuffing box around stem. Saves fluid loss and reduces hazards.

MAKERS OF "PEAK PERFORMANCE" VALVES FOR 50 Years 1892 1942

HOMESTEAD VALVE MFG. CO.

P. O. BOX 22 • • • CORAOPOLIS • • • PENNSYLVANIA

d-c power problems?



SERVING WAR INDUSTRY

Today, the Ignitron Rectifier is widely accepted as the answer to many power conversion problems. More than 2,000,000 installed capacity is now serving vital war industries.

ignitron

Wherever you need efficient, dependable power conversion in the 250-volt and higher range—that's a job for the Ignitron Rectifier.

Ignitron operating costs are low. Simplified automatic operation, low arc drop loss, the elimination of high starting demand and absence of major moving parts hold both operating and maintenance costs at a minimum.

Installation is easy, too. No special foundations are required. An Ignitron can be installed on any level floor of reasonable strength.

And most important of all is the uniformly high efficiency of Ignitron power conversion. It can handle constant 24-hour loads, peak loads, or light loads, all with the same relatively high efficiency.

It will pay you to investigate the advantages of Ignitron for your particular d-c power requirements. Your nearest Westinghouse office can give you full information. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

in the steel industry

The inherent advantages of the Ignitron Rectifier make it ideally suited for steel mill service. The outstanding feature is the practically straight line efficiency from light load to overload. Also, since there are no major moving parts to be affected by dirt and grit, the Ignitron requires less maintenance. Operation can be completely automatic to provide unattended service.

For further information about the Ignitron Rectifier, write Dept. 7-N for your copy of Book B-3024.

J-10244-1

Westinghouse *Electronics at Work*

IGNITRON RECTIFIERS

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

DON'T TAKE IT FOR GRANTED THAT YOU CAN'T GET DELIVERY

Fabricated Steel Plate Equipment including such units as

Breechings
Condenser Boxes
Dredge Hulls
Heavy Welded Products
Fabricated Machine Parts
Weldments
Heat Exchangers
Pontoons
Pressure and Vacuum Vessels
Spheres
Steel Stacks
Steel Storage Tanks
Stills
Towers
Clarifiers
Water Filters
Water Softeners

X-Raying and Stress Relieving Service

Graver Construction Division offers a complete service for the construction and erection of process equipment.

IT DOESN'T PAY to assume that everybody is too busy to build a vital piece of equipment for you. We're busy, of course. Who isn't?

But—production schedules are hard things to control these days—especially in a business like ours where the types of work we do are so varied. Despite the most careful planning, there are times when some departments get ahead of schedule while others are hard pressed to meet demands. And a week later the situation may be reversed.

Because of this condition, we are sometimes able to accept new orders for early production. Thus, we may be able to immediately handle your requirement. Of course, much would depend upon the CMP allotment this requirement would carry.

Don't take it for granted that you can't get what you need. First, mail us your specifications and prints. We will quote at once and advise you of the earliest possible production and delivery dates. You may be agreeably surprised.

GRAVER

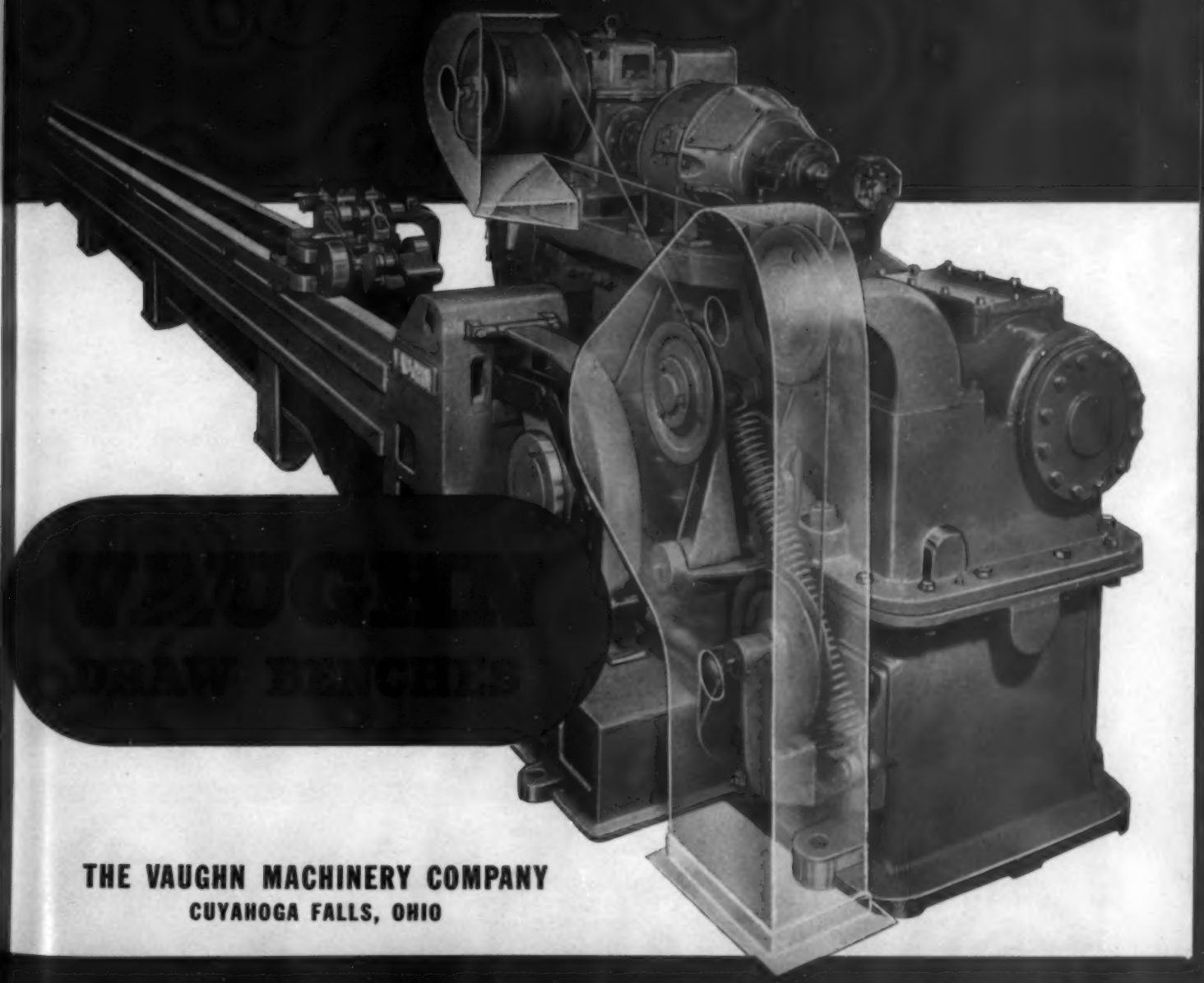
GRAVER TANK & MFG. CO., INC.

NEW YORK
CATASAUQUA, PA.

4811-29 TOD AVE.
EAST CHICAGO, IND.
CABLE ADDRESS — GRATANK

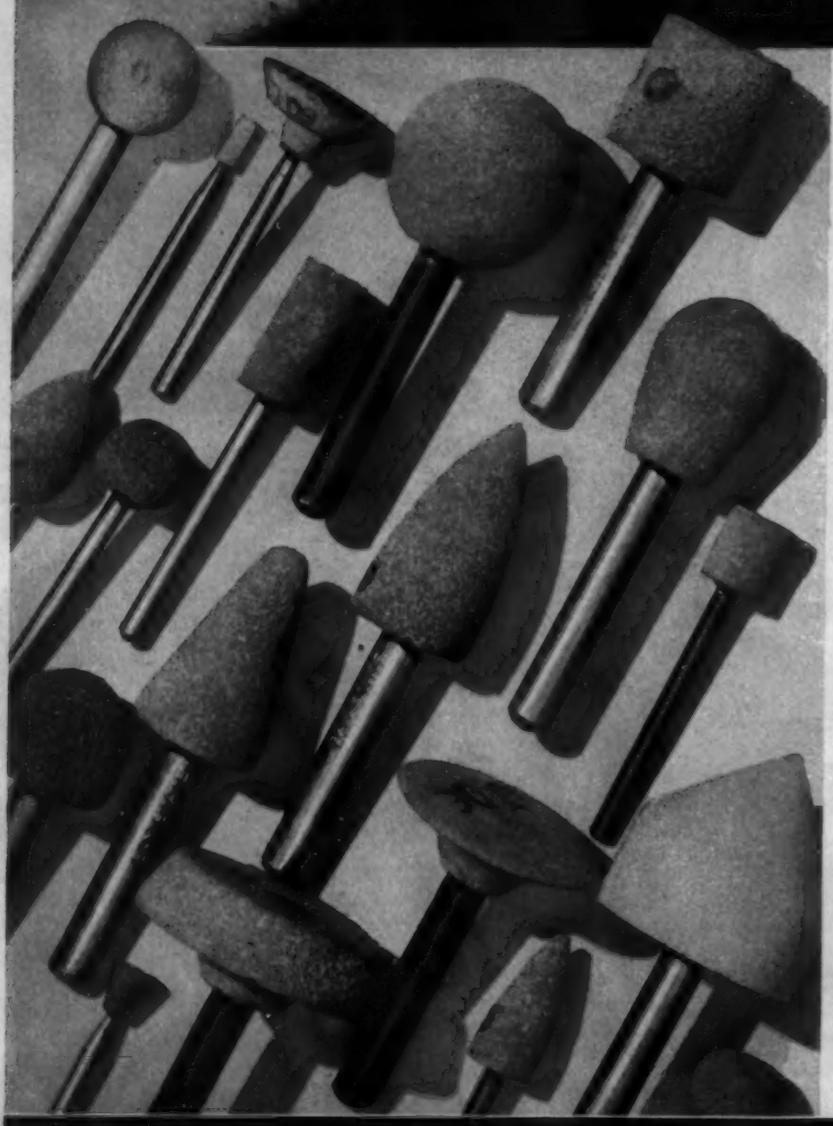
CHICAGO
TULSA

MAJOR ELEMENTS IN VAUGHN DRAW BENCH *Victory* PERFORMANCE



THE VAUGHN MACHINERY COMPANY
CUYAHOGA FALLS, OHIO

A little touch MEANS SO MUCH!



There are several honest-to-goodness reasons why BAY STATE wheels and points are preferred for those innumerable, fussy jobs on moulds and dies.

1. They are pressed into uniform blanks, assuring grade hardness.
2. They are formed absolutely true on BAY STATE precision lathes.
3. They are ready for immediate cutting action — in a myriad of shapes and sizes.
4. They can be used completely down to the spindle.
5. They will not come off the spindles.
6. They are free from "hard and soft" spots.

Send for illustrated catalog and bulletin containing standard stock and mandrel specifications.

BAY STATE WHEELS of PROGRESS

BAY STATE

ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.

THE SHORT CIRCUIT...

That Moves Mountains

ON our far-flung fighting fronts, and along our industrial front, a short circuit *in harness* is increasing the deadliness of our war weapons, speeding war production, conserving vital man power and materials. Its name—the G-E AMPLIDYNE.

In principle, the amplidyne is an externally driven d-c dynamo-electric machine. By unique use of a short circuit, together with load-current compensation, General Electric engineers have combined in it such high amplification and speed of response that tiny electrical signals release *kilowatts* of output capable of controlling the heaviest machinery.

With strength and amazing speed, the amplidyne executes the whispered orders of relays, selsyns, limit switches, electronic tubes, resistances—almost any source of control current. It maintains continuous control of voltage, current, speed, or position, instantly correcting any departure from the desired conditions.

The thousands of G-E amplidynes now in industrial and war service point to a future that challenges the imagination. The amplidyne will simplify your electrical systems and make them more flexible. Because its characteristics are permanently built-in, it will assure consistent performance year after year, yet it can be readily adjusted to meet changing requirements. It has a place wherever an electrical signal can express the need for a change, or prevent a change, in process.

To help you fit this versatile new tool into your plans for present and post-war improvements in product or process, G-E application engineers offer their full co-operation. Call on them freely.

GENERAL ELECTRIC

OUTPUT STEPPED UP

150 tons per shift—on giant cold-strip mills

DEADLINESS INCREASED

—of our land, sea, and air weapons

REJECTIONS DROPPED 50%

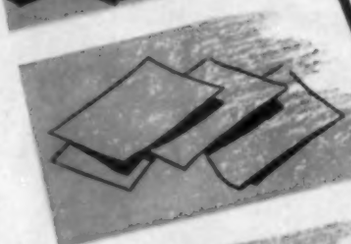
—on two tin-plate flow-brightening lines

CAPACITY ROSE

70,000 tons per month—on the world's largest shovel

SPEEDS CLIMBED

—in the performance of high-speed planers



VARIETY WIDENED

in the number of grades of paper that could be made on a single machine

SAVINGS TOTALLED $30,000

—in the cost of a new flying-shear installation

AMPLIDYNE

WHAT THE AMPLIDYNE DOES

CONTROLS SPEED

—accurately—over a wide range. Matches machine speeds to maintain continuous process control.

SPEEDS UP ACCELERATION

and deceleration, to increase production of high-inertia machines.

LIMITS LOADS

—to protect electric systems, to eliminate shock loads and destructive stresses on mechanical equipment.

POSITIONS PRECISELY

for fast and accurate setting of machine tools, arc-furnace electrodes and other equipment.

HOLDS TENSION

—to improve product uniformity in winding, rolling, and drawing operations.

REGULATES CURRENT,

voltage, power, and speed to maintain steady conditions, to improve power factor.

General Electric Company, Sec. 750-203
Schenectady, N. Y.

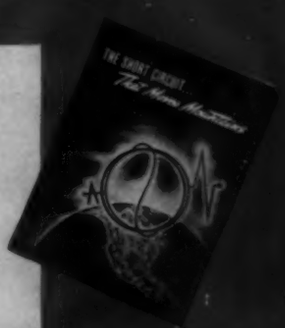
Yes, please send me your booklet "The Short Circuit That Moves Mountains".

Name.....

Company.....

Street.....

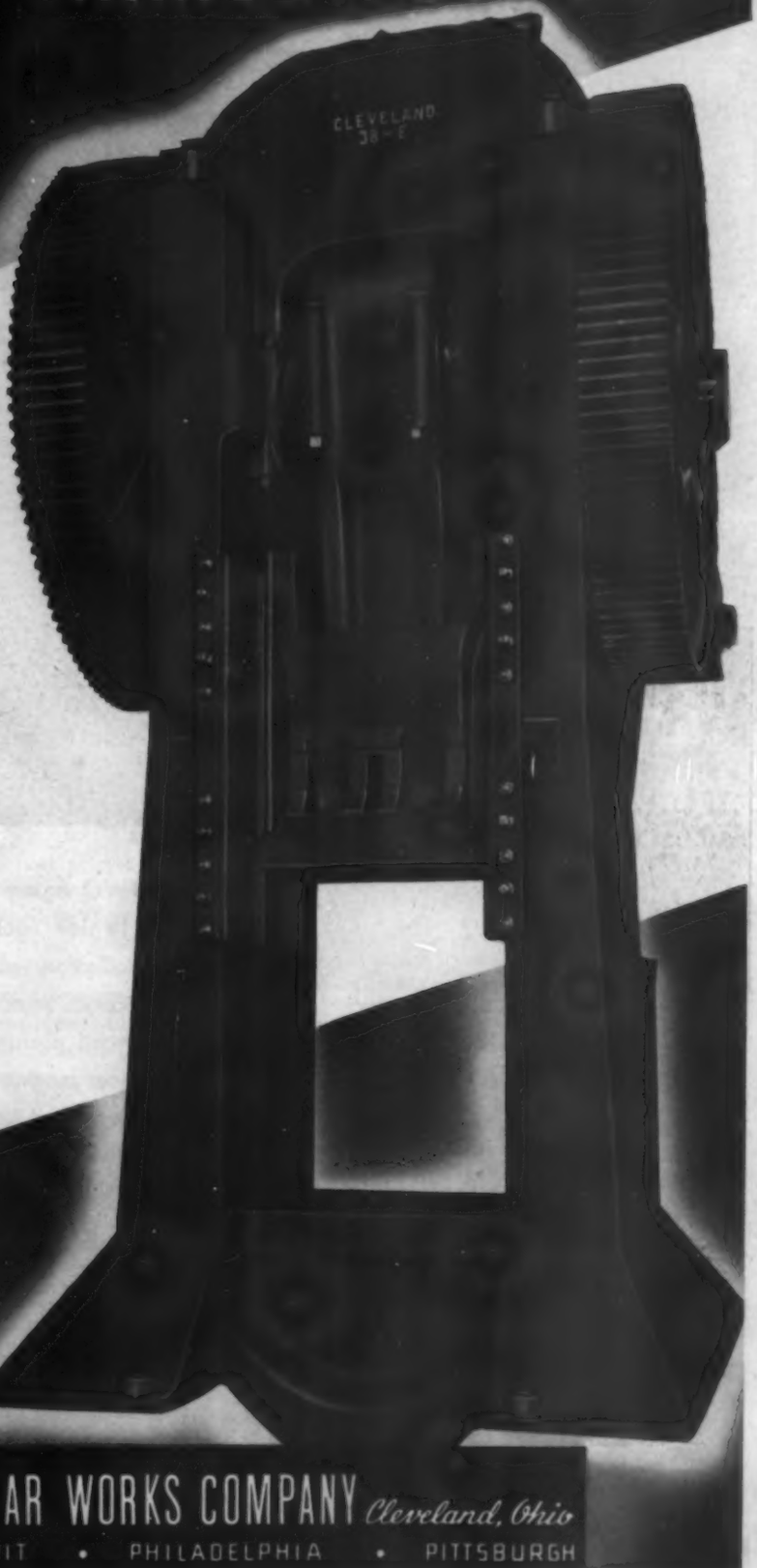
City..... State.....



Mail the coupon today for your free copy of "The Short Circuit That Moves Mountains", 28 pages with photographs and circuit diagrams showing what the G-E AMPLIDYNE does, how this unique amplifying generator operates, and where it can help you.

GENERAL ELECTRIC

MORE POWER *to our* ARMED FORCES



This Cleveland 38 E, Single Eccentric Press is but one of the many types of Clevelands which are being used to provide our armed forces with the means to wage offensive warfare.

This powerful "war worker" exerts a pressure of *2400 tons* and is equipped with a two station electrically controlled, air operated friction clutch.

The Press is arranged for twin drive to the eccentric shaft and operates at the rate of 20 strokes per minute.

Other Presses of this particular type can be furnished in various sizes and in the following capacities: 160, 185, 220, 315, 600, 830 and 1350 tons.

Modern Presses

THE CLEVELAND PUNCH & SHEAR WORKS COMPANY *Cleveland, Ohio*

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • PITTSBURGH

19 MAEHLER OVENS...

at the world's largest
Non-Ferrous Jobbing Foundries!

Right — 8 of 12 ovens at Howard. Two racks in each compartment — 24 racks in all. One gas fired Maehler air heater for each double oven. L & N and Wheelco controls and automatic dampers (a new Maehler development) for each heater.

Below—All ovens equipped with lift doors and Maehler type safety latches.

100% Maehler Core Ovens at Three Howard Foundries

Maehler re-circulating air heat core ovens are standard in Howard's three plants—the magnesium and aluminum foundries in Chicago and the bronze foundry at Aurora, Illinois.

•

Approximately 90% of Maehler's production is devoted to filling *repeat* orders for core ovens and heat treating furnaces—mute testimony to customer satisfaction. If you need ovens or furnaces, here is your best guide to a source of supply.

TWO aging ovens, one cabinet type core oven and twelve rack type core ovens—that's the Maehler installation at the Howard magnesium foundry in Chicago, making a total of 19 Maehler Ovens at all Howard plants. At full capacity this plant will be the largest magnesium sand casting foundry in the United States—and probably largest in the entire world! It's another American wartime industrial triumph, in which Maehler is proud to have played an important role.

In leading foundries throughout the country, you'll find Maehler ovens producing better, more evenly baked cores—faster—at less cost.

• MAEHLER •

The PAUL MAEHLER CO.

2206 W. Lake St. • Chicago

Industrial Ovens and Furnaces

MECHANIZE
Your Screw Driving Army

PHILLIPS SCREWS PERMIT FAST DRIVING METHODS!

Like our fast-moving fighting forces, your screw driving army can now be mechanized to set new speed records on the assembly line.

You can have the advantages of power or spiral driving on almost any job . . . by adopting Phillips Recessed Head Screws. Automatic centering of driving force in the Phillips Recess eliminates the driving troubles that often make fast driving methods impractical. Fumbling, wobbly starts . . . slant-driven screws . . . broken-head screws . . . dangerous skidding of driver points . . . all are forgotten problems in plants that use screws with the Phillips Recessed Head.

Even "green hands" can do fast, skilled work. Savings of 50% in driving time are common. Such man-hour savings are important to the war effort, since so many workers in the average plant are driving screws.

They cost less to use! Compare the cost of *driving* Phillips and slotted head screws. You'll find that the price of screws is a minor item in your total fastening expense . . . that it actually costs *less* to have the many advantages of the Phillips Recess in your assembly work.

KEY TO FASTENING SPEED AND ECONOMY

The Phillips Recessed Head was scientifically engineered to afford:

Fast Starting – Driver point automatically centers in the recess . . . fits snugly. Screw and driver "become one unit." Fumbling, wobbly starts are eliminated.

Faster Driving – Spiral and power driving are made practical. Driver won't slip out of recess to injure workers or spoil material. (Average time saving is 50%.)

Easier Driving – Turning power is fully utilized by automatic centering of driver in screw head. Workers maintain speed without tiring.

Better Fastenings – Screws are set-up uniformly tight, without burring or breaking heads. A stronger, neater job results.

PHILLIPS *Recessed Head* SCREWS

WOOD SCREWS • MACHINE SCREWS SELF-TAPPING SCREWS • STOVE BOLTS

21 SOURCES

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Manufacturing Co., Chicago, Ill.
Reading Screw Co., Norristown, Pa.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Manufacturing Co., Waterville, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

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GET IT THERE FASTER

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Booklets in time-money saving are free as follows; check and pin on your letterhead: Inventories ☐, Costs ☐, Payroll and Personnel ☐, Plant and Equipment ☐, Purchases ☐, Production ☐.

the card record system that speeds up production thru more efficient control. Cardineer is faster in finding—posting—reference. Each unit puts 6000 cards instantly at hand. Removable segments permit easy division of work at rush periods.

Cardineer saves time – saves space – cuts costs – conserves manpower. All these are more important now than ever before. Don't delay in securing complete information about Cardineer.

Phone, wire or write today.

DIEBOLD SAFE & LOCK COMPANY • CANTON, OHIO

Branch Offices in Principal Cities

ARMY E NAVY

DIEBOLD *Cardineer* **ROTARY FILE**

Why Vanadium is used in

ENGINEERING STEELS

Vanadium improves engineering steels by increasing their strength while maintaining their ductility. Vanadium-bearing steels are tough—resistant to abrasion, fatigue, and impact. They will deform rather than rupture under sudden overloads. This toughness is the result of a uniformly fine grain size imparted by vanadium to steel.

Vanadium steels are readily cast, forged, and rolled. They are easily machined; they have exceptional weldability. Vanadium . . . added in quantities ranging from .05 to .20 per cent, or roughly one to four pounds to a ton . . . simplifies the heat treatment of the steel. Its use results in a tough, strong, wear-resisting surface on case-carburized parts.

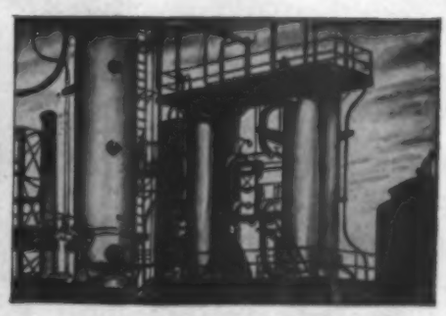
Besides vanadium, we produce other ferro-alloys and metals—such as chromium, silicon, manganese, tungsten, columbium, boron, calcium, and zirconium . . . used in making alloy steels. We do not make alloy steels, but we have over 35 years of experience with their development and use. If you have a problem in the selection or application of an alloy steel, call on us.

Railroads . . . Vanadium steels are used for locomotive piston rods, driving shafts, forgings, springs, boiler plates . . . for heavy-duty service.

BUY UNITED STATES WAR BONDS AND STAMPS

Tanks . . . Vanadium steels are used for armament and for engine parts, such as pistons, gears, axles, connecting rods, crank shafts . . . where strength and durability are life savers.

Mining . . . Drill bits, digging bars, wearing plates, winch shafts, and crank shafts for pneumatic machinery, are made of vanadium steels . . . for resistance to impact and wear.

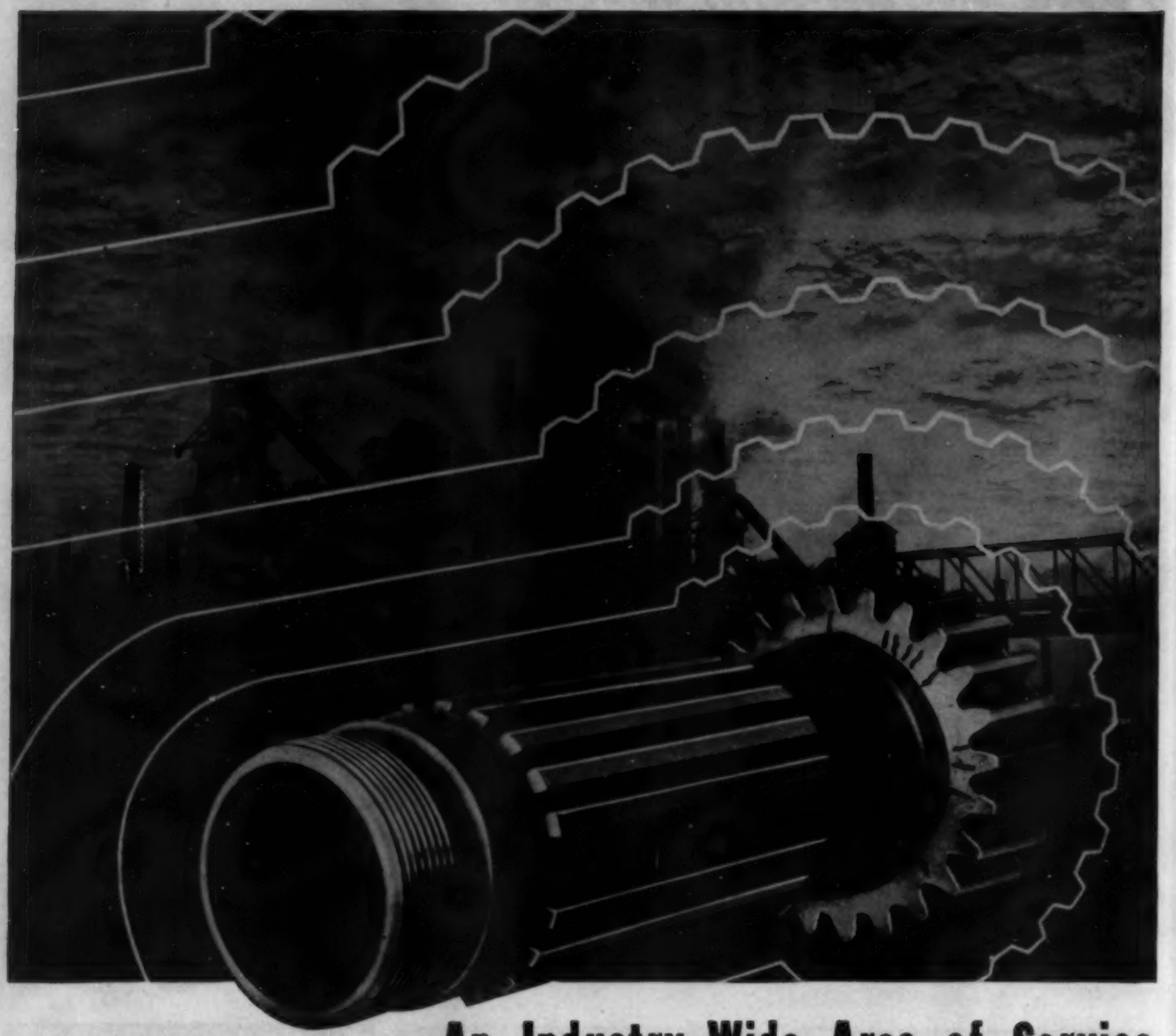


Process Industries . . . Vanadium steels are used for turbine shafts, internal combustion engines, pressure vessels, superheater tubes, and steam valves . . . for toughness and durability.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

Radiating Far Beyond the Magnetic Field of Magnaflux



—An Industry-Wide Area of Service

MAGNAFLUX RESEARCH

Since the pioneering stage of the original Magnaflux Method for steel, our engineers have sought to extend the benefits of *rapid non-destructive* inspection techniques in every field. For the important welding industry special portable equipment and new procedures for more sensitive results were developed. Magnaglo, recently announced, extends the usefulness of magnetic inspection. Zyglo is a new method of tremendous possibilities for the inspection of aluminum, magnesium and other non-magnetic and non-metallic materials.

And still the laboratory looks ahead.

• Men who have recently learned of Magnaflux through conversion to war production have a variety of ideas about it. They think of a piece of equipment or lines revealing cracks (as in the gear above)—or a can of Magnaflux Paste. These are only parts and details.

The Whole is the Magnaflux Corporation's comprehensive service to Industry in the field of non-destructive inspection. Twelve years of research, development and education by the Magnaflux engineering staff have provided an unparalleled base of specialized knowledge about defects in metal parts. This experience is shared among all Magnaflux users by means of traveling schools, special bulletins, text books, centralized laboratory service and regular contacts by field engineers.

The basic Magnaflux Method, originated and pioneered by this staff of men, is most widely known and used. Its saving to the Nation at war has been incalculable. The extra value of a plane that did *not* fall, or a gun mount and barrel which *lasted long enough* to stop the enemy, is hard to put into dollars-and-cents.

Intelligent engineering service—quick delivery—capable training are available through your nearest field engineering office.

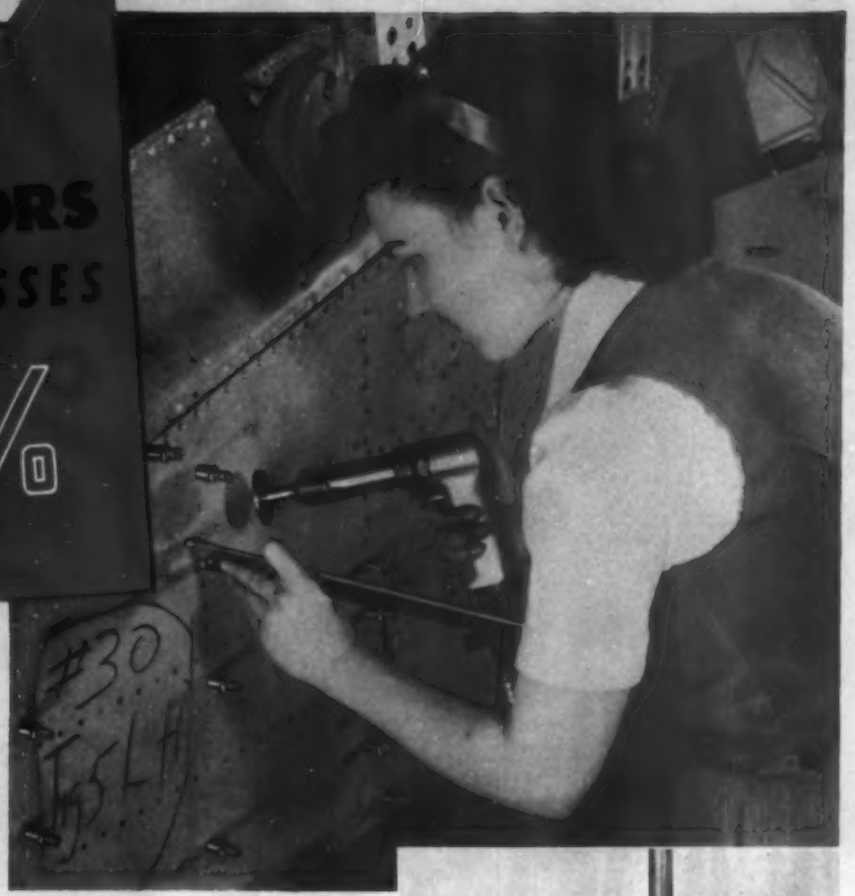
MAGNAFLUX CORPORATION

5912 Northwest Highway, Chicago

NEW YORK • DETROIT • LOS ANGELES • DALLAS

NEW!

CLECO RIV-N-JECTORS CUT RIVET LOSSES 90%


#30
Riv-N-Jector is held in the left hand —rivet hammer in the right, as usual. In driving, left hand can steady the tool, insuring accurate work.

The cost of reclaiming rivets which have been dropped or mixed in stock varies from 75% to 125% of the original purchase price. Out of 3 rivets issued to the operator, often only 1 is driven home, while the other 2 are wasted.

Cleco Riv-N-Jectors (patent pending) afford the perfect solution to this costly, wasteful problem. The Riv-N-Jector has a magazine holding about 50 rivets, which can be released one at a time into the rivet hole. Slight pressure of the fingers releases the rivet, while another rivet feeds down for insertion in the next hole. Riv-N-Jectors are easily loaded by a hopper-loader.

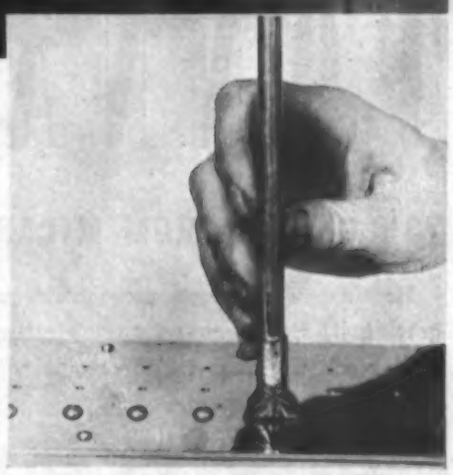
RIV-N-JECTOR ADVANTAGES

Less Waste—Using a Riv-N-Jector, the operator only loses 2 or 3 rivets out of 50, compared with loss of more than half when handled by hand—*a 90% saving!*

Greater Speed—With Riv-N-Jectors, operators often insert and drive 30 rivets per minute.

Easy Operation—Operators learn to use Riv-N-Jectors practically at a glance; at the end of the day they are experts.

No one engaged in airplane fabrication can afford to be without this remarkable device. For complete information, write for Bulletin 89.



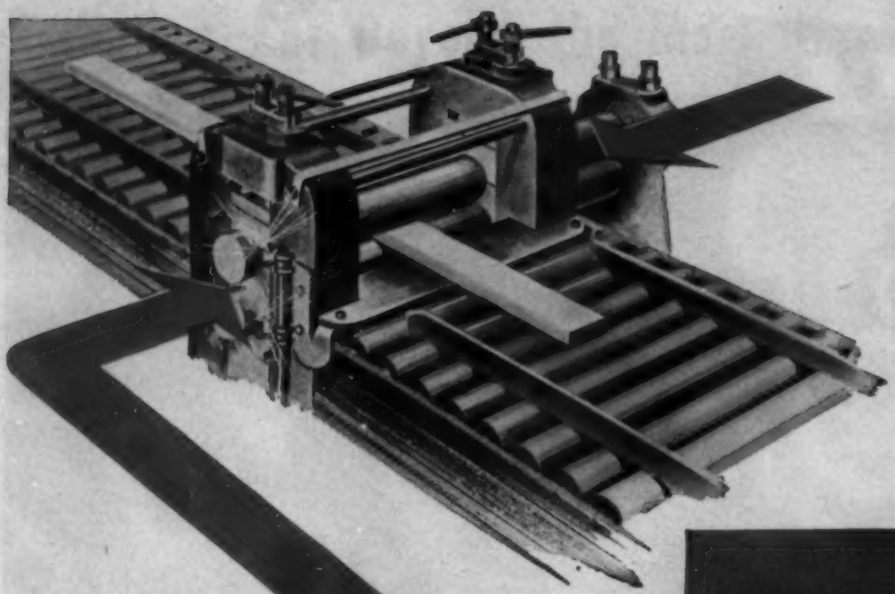
Inserting a rivet with the Riv-N-Jector.

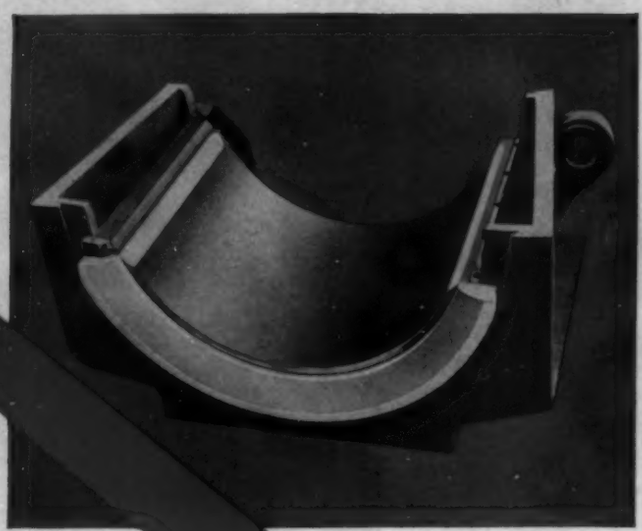
The Riv-N-Jector is feather-light, easy to handle.

BUY U. S. WAR BONDS AND STAMPS

THE CLEVELAND PNEUMATIC TOOL COMPANY

Branch Offices in All Principal Cities ★ CLEVELAND, OHIO





MORE TONNAGE

YOU GET IT FROM MICARTA ROLL NECK BEARINGS

Here's a way to get more tonnage—and keep on getting it! Run your rolls on Westinghouse Micarta Roll Neck Bearings made especially for heavy-duty rolling.

You'll have fewer time-outs for replacement or adjustment, fewer shutdowns for repairs.

- **2 to 4 times longer life**
- **Power savings up to 37%**
- **More accurate holding of gauge**
- **No more "hot necks" or "fire cracks"**

Westinghouse Micarta Bearings are made for every rolling operation from blooming to bar and billet mills. Micarta Bearings are helping to set new production records in continuous strip mill rougher and scale breaker roll stands, as well as in 3-high sheet mills. These and hundreds of other applications are giving *more tonnage*.

Mill records prove that long-life Micarta Bearings are giving more production with substantial savings in power, grease, and replacements. J-06320

Write for complete details to Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Dept. 7-N.

Westinghouse Micarta

SALEM GAVE US A SURE-FIRE METHOD OF ANNEALING ALUMINUM . . .

Ingenuity Again Speeds War Production

So, instead of using off-the-shelf drawings, Salem Engineers design and build SPECIAL aluminum annealing furnaces to meet individual requirements. Sure enough, they use proven methods that are the products of broad experience...but Salem Engineers use ingenuity, too. For example—in the furnace pictured above, a unique method of convection heating is applied to a furnace in which the dolly method is incorporated for handling aluminum plates and sheets. Among other things, Salem's "KNOW HOW" provides the proper ratio between radiation and circulation which permits the most accurate, uniform, and dependable production—no re-melting, no re-treating. Here is not an ordinary low temperature oven, but rather a sturdy HEAT TREATING FURNACE that couples big production with accuracy—low heating costs with low maintenance expense. Write today.

SALEM ENGINEERING COMPANY

SALEM ENGINEERING CO. · SALEM, OHIO

"BACKBONE" GIVES THE MILWAUKEE ACCURACY AND PERFORMING POWER

Air attack! Instantly the antiaircraft guns spring into action — pumping shells into the sky —spreading dense clouds of destructive "flak" for enemy planes. AA guns need plenty of "backbone" to hurl tons of metal to flying levels overhead.

Milling tough metals and alloys at high speeds and to close tolerances, hour after hour, isn't quite as spectacular, but the machine that handles the work must have similar backbone to withstand the ceaseless strain and vibration.

In milling machines — *rigidity* — an indispensable quality in any machine tool — originates in the column, the backbone of the machine. The column of the Milwaukee Vertical Milling Machine is engineered for the proper distribution of metal to provide a backbone that holds vibration to the minimum.

The solid column back — the small openings in its neutral axis exemplify correct engineering in every detail.

It is features like this which have enabled Milwaukee Milling Machines to do more than the "usual" under the stress of wartime production.

KEARNEY & TRECKER
CORPORATION
MILWAUKEE, WISCONSIN

Buy Victory with at least 10% in War Bonds!

Milwaukee **MACHINE TOOLS**

Let's Put The Scrap Into The *Scrap!*

Turnings, clippings, short ends, worn out or broken tools — all these are valuable as precious scrap for remelting in the production of new steel. Surprising amounts of dormant scrap accumulate in every plant daily — collect it — segregate it. Set up a system for the regular pick-up and handling of this valuable raw material. Remember, it's a war on waste, too, and every bit of scrap collected counts in production for Victory.

18 CAM MILLING METHODS

. . . Described and Explained in this Kearney & Trecker Corporation Bulletin

Machining and milling cams of various types present special problems. This series of articles, reprinted from American Machinist in bulletin form, explains methods of cam milling from the practical shopman's viewpoint.

Many machine setups are illustrated, including working diagrams. Eighteen cam milling methods are described, such as use of the Rotary Table, Dividing Head, Dummy Templets, Rotary Head Milling Machine, etc.

Written by the department of Industrial Research, Kearney & Trecker Corporation, this bulletin will prove valuable to every shopman. Write Dept. CM for your copy.

Buy Victory with at least 10% in War Bonds!

Kearney & Trecker *Products* CORPORATION
MILWAUKEE, WISCONSIN
Subsidiary of Kearney & Trecker Corporation

Kearney & Trecker CORPORATION
Milwaukee, Wisconsin

CMP Cold Rolled Precision Strip Steel
A *Vital* Material Today, *Versatile* for Tomorrow

Already hundreds of new products for the better world of tomorrow are "on the boards" today. Products that will bring still greater conveniences in our homes — products that will revolutionize and improve manufacturing methods for industry. In many cases materials will play the vital role to make possible the practical reality of engineers ingenious plans.

Right now, numerous materials are proving new peace-time adaptability on the war and production fronts. CMP strip steel is one of these. By replacing light gauge non-ferrous metals for essential war needs and by meeting unusual physical characteristic requirements, CMP strip has established interesting potentials for many advantageous applications after Victory. Worth an investigation for your 194? products? CMP offers their cooperation.

THREE CMP STRIP FACTS . . .

Controlled Uniformity

Vigilant guard and precise control methods assure duplication of all desired properties in coil after coil.

Extra Long Coils

Normally CMP strip can be supplied in coils up to 300 pounds per inch of width — lessens press interruptions — helps speed production.

More Feet Per Pound

CMP rolling practice means exceptionally close tolerances whether specified or not — provides maximum feet per pound — more parts per ton.

THE COLD METAL PRODUCTS COMPANY

Subsidiary of The Cold Metal Process Co.

YOUNGSTOWN, OHIO

The Searchlight got a bright idea from the Outboard Motor

OFFHAND, you wouldn't think there was anything in an outboard motor that could make the going easier for an anti-aircraft searchlight. In designing "outboards," the chief requirements are small space and high load capacity. So builders of outboard motors chose the Torrington Needle Bearing—it's unusually compact for an anti-friction bearing, and noted for high load capacity.

In the anti-aircraft searchlight, size of parts is a secondary consideration, so long as the equipment is transportable. Yet searchlight designers, ever striving for quicker response in locating enemy aircraft, welcomed the Needle Bearing as eagerly as outboard motor manufacturers. And not merely for its high load capacity, which helps prevent overloading and breakdowns, or low coefficient of friction, permitting crews to swing a searchlight's beam into immediate action at the first warning signal.

There's the Needle Bearing's reliable performance, for example—an invaluable feature when enemy planes are overhead—its effective system of lubrication, which enables the bearing to run for long periods without *any* attention at all—and its ready availability, helping to provide our Armed Forces with enough and on time.

NEEDLE BEARINGS FOR ALL PURPOSES

LOOSE ROLLERS are produced in a range of sizes for assembly into low-cost, high-capacity anti-friction bearing units. They are particularly adaptable to applications where volume permits installation of the necessary equipment.

NEEDLE BEARINGS are complete, self-contained units consisting of a full complement of rollers and a thin, hardened outer race. They offer the advantages of small size, low cost, high capacity—and are easily, quickly installed.

QUILL BEARINGS consist of a full complement of rollers and a relatively heavy hardened outer race. They are furnished with or without inner races. Quill Bearings are adaptable to heavier load requirements than Needle Bearings.

THERE MAY BE AN IDEA HERE FOR YOU, TOO, in planning your product's post-war designs. Savings in weight, compact design, infrequent lubrication, dependable operation—these are features your regular customers most likely will insist upon after the war, and the Needle Bearing has every one of them, as well as low cost and ease of installation. Now is the time to "iron out," with the help of Torrington engineers, the details in adapting the Needle Bearing to your particular applications. For preliminary information on sizes, ratings, and typical applications, send for Catalog No. 110.

THE TORRINGTON COMPANY

Established 1866 • Torrington, Connecticut, U. S. A.

Makers of Needle Bearings and Needle Bearing Rollers

New York Boston Philadelphia
Detroit Cleveland Seattle
South Bend San Francisco Chicago
Los Angeles Toronto London, England

TORRINGTON NEEDLE BEARINGS

I'll Guard the home front

—against the forces of GENERAL WEAR

"HARCOTE" is ready! Ready to protect softer steels against the ravages of wear — to help you keep machinery on the job — now — when replacement parts are so difficult to obtain.

P&H "Harcote" is a hard surfacing electrode — both *hard* and *tough!* It's ideal for refacing parts subject to severe wear and abrasion, such as shovel teeth, scraper blades, farm implements, sand and rock handling equipment, and many other applications on carbon steel, low alloy and high manganese surfaces. "Harcote" is just one of the family of P&H Alloy Electrodes which answer every welding need. P&H representatives will gladly assist you. Or write us for literature and procedures.

Ask also for information about P&H Arc Welding Machines.

P&H Alloy ELECTRODES

ARMY E NAVY

A new star has been added to P&H's award for excellence in war production.

General Offices: 4411 W. National Avenue, Milwaukee, Wisconsin

HARNISCHFEGER CORPORATION

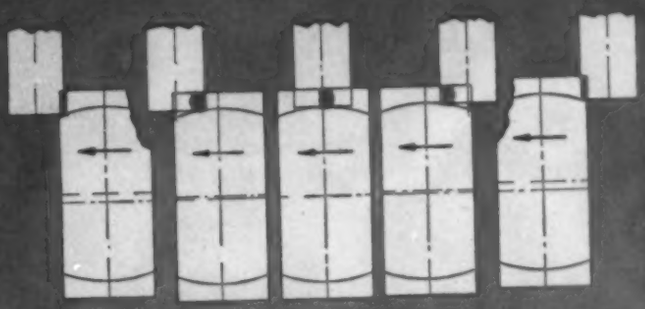
WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Canadian Distribution: The Canadian Fairbanks-Morse Co., Ltd.

Compare

THESE METHODS OF SHAVING

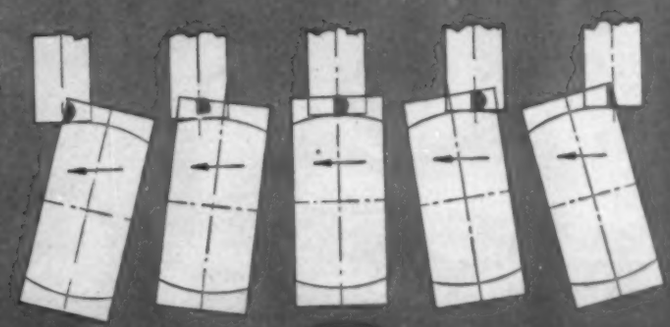
ELLIPTOID (CROWNED) TEETH



CAM IN-FEED . . . Not Recommended

Here cutting is done by the unsupported edge of the cutting tool except at the point of maximum tooth thickness. As the cutter moves away from this point, it produces steps or chatter marks in the tooth surface on the downhill side of the cut.

Cutting serations are not tangent to the point of contact when crowning.



RED RING METHOD (DESIRABLE)

In the RED RING method, cutting clear across the tooth face is done by the central zone of the cutter at the intersection of its axis with that of the work gear where maximum control and smoothness is assured. The amount of crown can be varied to accommodate any particular application.

Cutting serrations are always tangent to the point of contact, thus assuring maximum machine cutting efficiency.

Write for descriptive bulletin on the RED RING Shaving Machine.

SPECIALISTS ON SPUR AND HELICAL INVOLUTE GEAR PRACTICE

ORIGINATORS OF ROTARY SHAVING AND ELLIPTOID TOOTH FORMS

NATIONAL BROACH AND MACHINE CO.

RED RING PRODUCTS

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Steel cartridge cases made by Buick meet test of interchangeability with brass. *Page 92*

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STEEL

The Magazine of Metalworking and Metalproducing

MAY 3, 1943

Volume 112 *Number 18*

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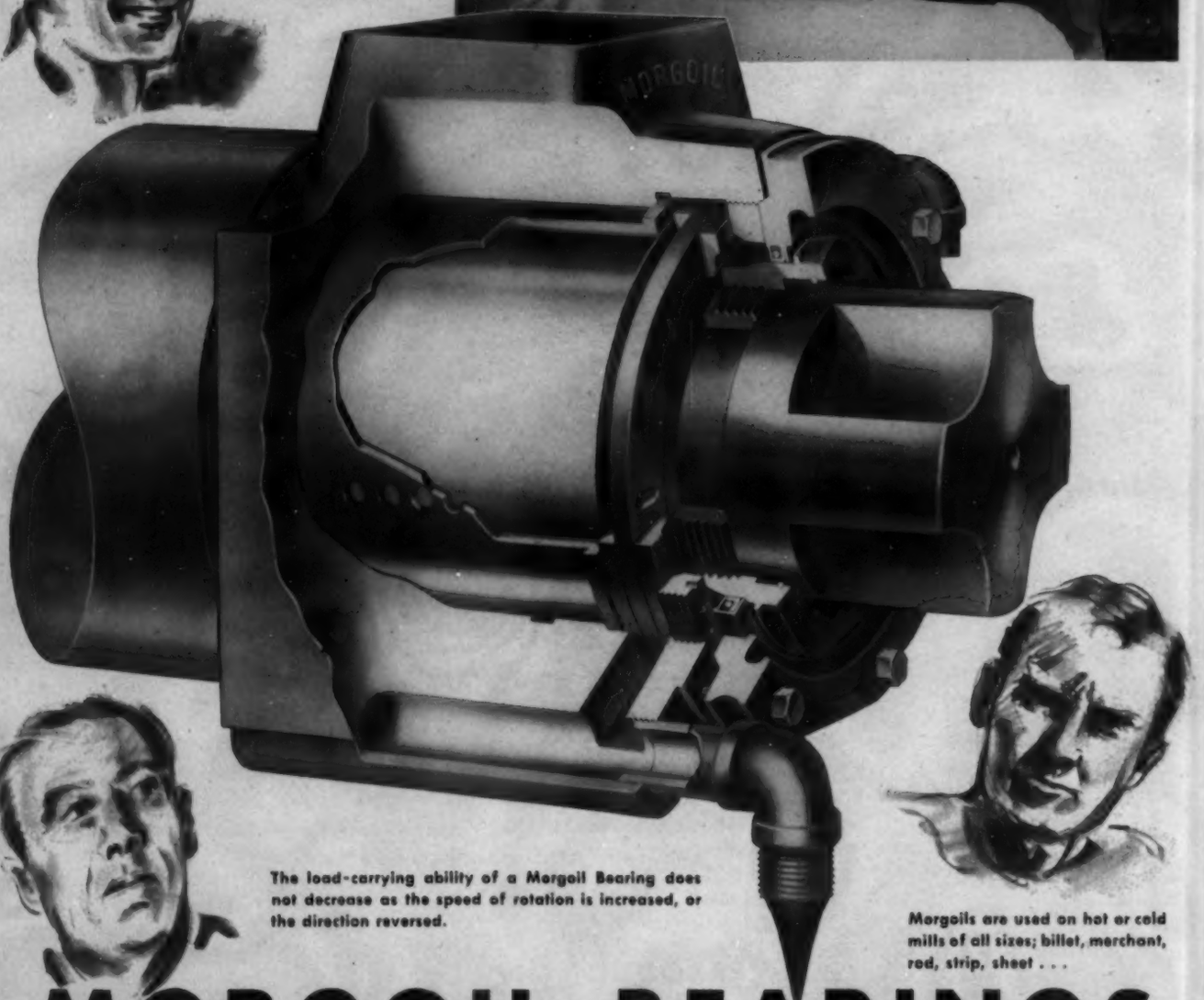

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AS THE EDITOR VIEWS THE NEWS

STEEL
May 3, 1943

NO TAMPERING NOW: Some persons in Washington are determined to revamp the United States patent system in wartime, basing their demands upon the claim that privileges accorded under the patent laws have been abused. One of the attacks upon the patent system is TNEC Monograph No. 31 entitled "Patents and Free Enterprise" written by Walton Hamilton, professor of law at Yale University. The monograph is not a presentation of facts; it is heavily seasoned with anti-business opinion.

A. W. Deller, patent attorney, has answered Mr. Hamilton's presentation in a recent issue of the Harvard Law Review. He points out that Mr. Hamilton assumes that a patent provides a monopoly for the patent owner, whereas, as a matter of fact, a patent really reveals to the world the details of an invention and throws it open to public use after a period of development by its owner.

Patents mean so much for America's way of life that it seems prudent to suggest that the American patent system be left as it is for the duration. After the war is over, Congress may well authorize a complete study of it and act accordingly.

In the meantime, such adjustments as may be desirable to meet war conditions can be made by voluntary action or negotiation. Standard Oil of New Jersey and Firestone recently turned over patents on Buna-S to all who can benefit from them. This is far more effective than hasty wartime "doctoring" of the patent system.

• • •

STEEL SHELL CASES: War seldom imposes a more difficult problem in the adaptation of materials than that of substituting steel for brass in cartridge cases. Early in the present conflict it became evident that something had to be done to ease the unprecedented demand for brass. The obvious substitute was steel, but the technical difficulties involved were exceedingly numerous and complex.

Undaunted, the War department set up an ordnance-industry committee to marshal the "know how" of metallurgists and metalworking experts. Their collective experience was placed at the disposal of some twenty-odd manufacturers. Today many of these concerns are turning out steel shell cases on a mass production basis.

How they licked the numerous problems is indicated by the achievements of the Buick Motor Division of General Motors Corp. In 41 intricate operations (p. 92), it transforms a hot cylindrical slug of steel into a finished phenolic varnish coated cartridge case.

The successful development of this routine reflects great credit upon all who had a hand in it. Someday, when we can appraise performance dispassionately, we are going to conclude that the experts in cold forming operations contributed liberally in this war.

• • •

YAKUTSK, U. S. S. R.: Wendell L. Willkie's book, "One World", merits close reading by every thoughtful American. It should be particularly interesting to industrialists because it deals realistically with many problems of the people of Europe, Asia and Africa which will bear upon postwar trade.

In reading "One World", one should look for economic and social truths and not for passages of seeming political significance. Try to think of Mr. Willkie, not as a candidate for public office, but as a middle-western American—Hoosier-bred and matured in big business—who is trying to understand the aspirations of men and women in foreign lands.

For example, consider the chapter on Yakutsk. It makes sense as a sidelight on social and economic conditions in Siberia. Try to make political capital out of it and one is engulfed in confusion.

Yakutsk, a city of 50,000 people, is the capital of a republic of the same name twice as big as Alaska, inhabited by 400,000 persons. It has fabulous natural resources, mostly undeveloped. The people want to develop these resources.

They will, if their spirit is any criterion. Upon his arrival at Yakutsk, Mr. Willkie asked to see the library. He was shown a library containing 550,000 volumes. The records showed that 100,000 books had been taken out during the past nine months.

Mr. Willkie asked to visit a theater. He was escorted to a playhouse where a Leningrad company was playing a gypsy opera. It was the ninth con-

(OVER)

secutive night this production had shown in Yakutsk.

Before 1917 only 2 per cent of Yakutsk's population was literate. Today 98 per cent is literate and Moscow has ordered that the remaining 2 per cent is to be made literate before the end of 1944.

Mr. Willkie's simple word picture of far-off Yakutsk emphasizes the zeal of the Soviets for education, culture and national development. The Communist party is bent upon teaching the people to be smart and intelligent so that they can work more effectively for a better order.

We in the United States cannot afford to ignore a nation whose people have such zeal for learning. Russians study to better their position. Are we working as studiously to hold the freedoms and benefits we already enjoy?

This question is the unwritten moral of Mr. Willkie's outstanding book.

• • •

ROMAN HOLIDAY: Last Monday Philip Murray issued a "directive" to all industrial union councils calling upon them to press for increased taxation upon upper-bracket incomes. He charged that "corporations are enjoying a Roman holiday from grossly inflated profits" and that the steel industry is a typical offender in that its profits for 1940, 1941 and 1942 exceeded those of 1939 by more than a half billion dollars.

If Mr. Murray is quoted correctly he is making demagogic use of distorted figures. According to STEEL's annual compilations of steel company earnings, 23 producers having more than 90 per cent of the nation's ingot capacity reported net income, after taxes, of $165,441,673 in 1939. The comparable figures for 1940, 1941 and 1942 were 297 and 305, and 218 millions, respectively. These latter amounts exceed the 1939 income by 152 and 140 and 53 millions, respectively. The excess in the three years totals 345 million. Mr. Murray's half-billion is an exaggeration.

To imply that this excess constitutes a Roman holiday of grossly inflated profits is to ignore completely the extent to which the workers, the government and owners have shared in industry's wartime income. The shares of the wage earners and the government have increased much more than the share of the owners.

Most pertinent of all is the fact that the residue of income remaining to be put back into the business now is declining sharply. If Mr. Murray were realistic, he would be asking his councils to plead for justice to industry to the end that employers might accumulate a reserve to ease the shock of postwar adjustments.

Instead he is inciting class hatred and at the same time undermining the future security of his own members.

• • •

GRANDSTAND STUFF: Secretary of the Interior Harold L. Ickes, who is working hard to become recognized in history as the crotchety sour puss of the New Deal administration, made this crack at a Truman committee hearing last Tuesday:

"Nelson gets the headlines in all the afternoon papers . . . . I get nothing but the morning papers. I don't like it at all."

Mr. Ickes intended this as caustic humor, but it raises the serious question as to just how much a public official feels he must "play to the grandstand" in order to do his job well in time of war. A sizable proportion of the persons in high position in Washington, we suspect, are unduly conscious of the advantage of figuring in the limelight frequently.

This is all the more reason why we should honor the thousands of faithful government employes who toil hard, long and well without the incentive or blessing of public applause.

• • •

PLUSES AND MINUSES: One of the interesting aspects of wartime psychology is the consistency with which men identified with industry attend conventions. Every meeting held since Pearl Harbor which has featured technical sessions has attracted better than average attendance.

This was true of the forty-seventh annual meeting of American Foundrymen's Association St. Louis last week. More than 2500 foundrymen were present. They listened attentively to a program dominated by discussions of wartime problems of the castings industry.

Much that they heard dealt with notable achievements in foundry technology. Likewise they heard frank statements of problems which remain unsolved. It is no exaggeration to say that in providing a forum for discussing the pluses and minuses of foundry cooperation in the war effort the AFA convention not only was a success but it was a definitely constructive force in the war program.

E. L. Shaner

EDITOR-IN-CHIEF

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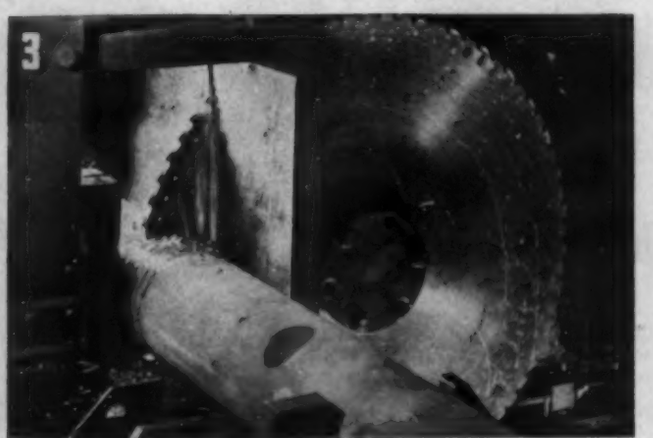

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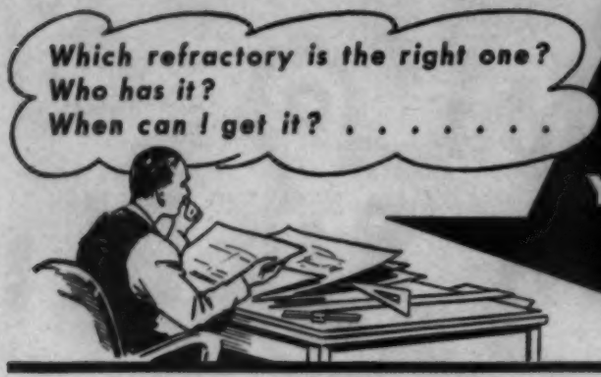

HERE'S INFORMATION THAT WILL HELP YOU ANSWER THESE QUESTIONS!

Data on LACLEDE High Temperature Refractory Specialties

	Fusion Temp.*	Containers	Type of Set	Wt. per Cu. Ft.	Lbs. per M Brick	Acid or Neutral	Uses
CEMENTS							
METALTITE Slag Resisting Mortar	3320° F.	100-lb. bags	Heat	90 lbs.	400	Neutral	Molten metal and slag conditions
SETSKOLD C-7 Kyanite Super Duty	3225° F.	100-lb., 250-lb., 500-lb. drums	Air	130 lbs.	350	Semi-neutral	Extreme heat and thermal shock
SETSKOLD C-9 (Dry) Kyanite Super Duty	3225° F.	100-lb. bags 100-lb. drums	Air	105 lbs.	350	Semi-neutral	High heat and thermal shock
SETSKOLD First Quality	3100° F.	100-lb., 250-lb., 500-lb. drums	Air	125 lbs.	350	Acid	General purpose, strong bond
FURNOSET First Quality	3125° F.	100-lb. bags	Heat	100 lbs.	400	Acid	General purpose, intermediate bond
LACLEDE BONDING MORTAR No. 20 Special, First Quality	2825° F.	100-lb., 250-lb., 500-lb. drums	Air	130 lbs.	350	Acid	Hot patching
CHROME MORTAR Chrome Super Duty	3300° F.	125-lb. bags 125-lb. drums	Air	150 lbs.	500	Neutral	Chemical and slag conditions
ACID PROOF First Quality	2750° F.	100-lb., 250-lb., 500-lb. drums	Air	125 lbs.	350	Acid	Write for detailed information
ARCHNU Compressible, First Quality	3075° F.	100-lb. bags	Air	80 lbs.	450	Acid	Compressible mortar
INSUMENT (Wet) First Quality Mortar for Insulating Brick	3000° F.	100-lb., 250-lb., 500-lb. drums	Air	100 lbs.	350	Acid	Laying and surfacing insulating fire brick
PLASTICS							
SUPER PLASTIC Super Duty	3270° F.	100-lb. cartons 250-lb., 500-lb. drums	Heat	140 lbs.		Neutral	Boiler and metallurgical furnaces
FURNASEAL First Quality	3075° F.	100-lb. cartons 250-lb., 500-lb. drums	Heat	133 lbs.		Acid	Monolithic linings and repairs
C-8 KYANITE RAMMING MIX Special, Super Duty	3300° F.	125-lb. drums	Air	150 lbs.		Semi-neutral	Ferrous and non-ferrous melting
SILICON CARBIDE RAMMING MIX Special, Super Duty	3100° F.	100-lb. bags	Air	135 lbs.		Acid	Non-ferrous melting
CASTABLES							
HEARTHMIX First Quality Mix and Pour	2700° F.	100-lb., 50-lb. bags	Hydraulic	108 lbs.		Acid	Heating furnaces, special shapes
SUPER CASTABLE Super Duty Mix and Pour	2950° F.	100-lb., 50-lb. bags	Hydraulic	108 lbs.		Semi-neutral	Heating furnaces, special shapes, severe conditions
BAFFLEMIX Mix and Pour for Baffles	2700° F.	100-lb. bags	Hydraulic	108 lbs.		Acid	Boiler and furnace baffles
CASTFAST Quick Setting Castable	2600° F.	100-lb. bags	Hydraulic	108 lbs.		Acid	Trowelling castable
PORE-LITE Light Weight Castable	2500° F.	70-lb. bags	Hydraulic	70 lbs.		Acid	Annealing furnaces, special shapes
COATINGS							
FURNASCOTE First Quality	Wet 3000° F. Dry 3100° F.	100-lb. bags 250-lb., 500-lb. drums	Air	100 lbs.		Acid	Furnace coatings

*In most cases 50° to 100° should be allowed below fusion points as shown.

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All of these products are produced from the same type of high quality materials that characterizes all Laclede-Christy products, and all of them are available for prompt delivery from convenient stock points all over the country. A Laclede-Christy engineer will assist you with the selection of the right refractory if you need him. Call him in.

Send for your copy of the detailed version of the chart shown

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Steel Producers' Stocks Vary; Average Thirty Days

Prolonged stoppage by mines would be reflected soon in mill operations. . . Clairton, Pa., works of Carnegie-Illinois Steel Corp. and beehive ovens hardest hit

STEEL producers at week's end faced the threat of a nation-wide coal strike with stocks varying from ten days' supply up to sufficient for several months. On an average, stocks appeared to be sufficient for 30 days, although cessation of mining would be reflected in diminished operations of steel mills, blast furnaces and coke ovens much earlier.

Probably the tightest spot in the country was at the giant Clairton, Pa., coke works of the United States Steel Corp. This unit supplies blast furnace coke for all corporation subsidiaries in the Pittsburgh district and also provides coke oven gas for steelmaking furnaces at several points. Because of the immensity of the operations, it has been virtually impossible to build up any substantial stocks, and present supplies are sufficient only for about ten days.

Corporation officials planned to ration supplies if coal mining stopped so that operations would decline in an orderly manner. As a result, steelmaking, now at 100 per cent of capacity, would drop to 75 per cent within the first week, to 22 per cent by the end of the second week. This latter rate probably could be maintained for a least a month.

East Has 30-Day Supply

On the East coast, most producers had an average of 30 days' supply. Cessation of mining, however, would bring curtailment of operations before coal supplies were exhausted. For the first week, normal operations were expected to be continued.

Eastern producers relying on merchant iron would be harder hit than normally because under the present allocation system they sometimes are called upon to draw upon furnaces farther away than normally and in areas where greater reliance is placed on beehive coke, stocks of which are practically nil. This drawing upon distant furnaces, however, is less pronounced than several months ago due to efforts exerted by the War Production Board and the Office of Defense Transportation to eliminate long hauls.

Most eastern power plants have a fairly comfortable supply, averaging 30 to 45 days. Leading manufacturing companies have supplies for their own requirements for from 30 to 60 days. Their chief concern is cessation of shipments from suppliers who might be more quickly affected, and by a probable slowing of transportation.

Eastern producers are fairly well stocked with scrap and a transportation slowdown would not immediately affect this phase of steelmaking. At least three mills still are holding up shipments on some grades. One mill is holding up shipments of all grades except breakable cast and such allotments as the government made some weeks ago and shipments of which are practically concluded.

In the Chicago district, coal stocks range from a few weeks to several months. A stoppage of mining, however, would force some curtailments of steelmaking immediately.

Mills have attempted to build up inventories, but this has been difficult in the face of capacity operations and an over-burdened transportation system.

Subsidiaries of United States Steel Corp. appear to be on the most uncomfortable spot. Possessing only three weeks' supply of coking and other coal, the subsidiaries would be forced to effect a 25 per cent reduction in operations during the first week and progressive further curtailment later.

Carnegie-Illinois Steel Corp.'s South Chicago works is dependent upon the Gary works for its coke supply; consequently both plants would suffer from any scaling down in coke oven operations. Affected also would be the company's armor plate plant at Gary which obtains its steel from the Gary works.

The city of Gary would be hard hit for its domestic gas supply since this fuel is obtained from the Gary works.

A major portion of company's coal supply comes from its own mine at Westville, Ill., near Danville.

Wisconsin Steel Co., subsidiary of International Harvester Co., has a substantial coal supply, capable perhaps of sustaining current steelmaking operations for three or four months. It receives its coal from its own mine in Benham, Harlan county, Kentucky. Manned by the Progressive Mine Workers of America (AFL), the mine was in operation last week, but there was no assurance it

Three hundred thousand tons of coal, but only a ten-day supply for the United States Steel Corp.'s mills at Clairton, Pa. NEA photo

Defying the government were these four top officials of the United Mine Workers of America, left to right: Percy Tetlow, president of District 17, southern negotiating committee; John O'Leary, vice president, UMW; John L. Lewis, UMW president; Thomas Kennedy, UMW secretary-treasurer. NEA photo

would continue. Manufacturing plants of International Harvester have approximately six months supply of coal on hand, and no curtailment of activity is likely.

Inland Steel Co. receives a portion of its coal from its own mines in Wheelwright, Ky., and mining there was unaffected at week's end. Officials of the company declined comment on the coal supply situation and how its steelmaking program might be affected by a coal strike.

Generally speaking, stocks of industrial coal in the Chicago district are sufficiently comfortable that little hardship will result from a strike unless it is of long duration. Most coal operators expected a shut down of several days, although there is some feeling that mines in Illinois and Indiana might not be struck.

In the Ohio Valley district, the supply situation was acute and blast furnaces using beehive coke were expected to be affected within a week or ten days. By-products plants generally had supplies sufficient for three to four weeks.

Pittsburgh Has Week's Supply

In the Pittsburgh district, Jones & Laughlin Steel Corp. reported all its coal operations down and only about one week's supply on hand for marginal operation. At the end of a week, operations would begin to drop progressively.

Pittsburgh Steel Co. had 11 mines down, and last week was losing production of about 12,000 tons a day. Stocks of coal above ground are sufficient for about 30 days.

Strikes at Weirton Steel Co.'s mine at Isabella, Pa., were temporarily settled last week. Company has a fair supply of fuel on hand.

Pittsburgh utility companies, after the strike scare two years ago, constructed additional storage facilities and now have several months' supply.

First units in the Pittsburgh area to feel the pinch would be the beehive coke ovens. These do not maintain any appreciable supplies of coal and any stoppage of mining forces them to close within a few days.

Several Mines Down

Rail-connected mines of the Woodward Iron Co., Sloss Sheffield Steel & Iron Co. and Republic Steel Corp. in the Birmingham district were down last week. All but one of Tennessee Coal, Iron & Railroad Co.'s units were closed.

Industrial gas supply for other industrial plants in the South was jeopardized by the stoppage, and producers had little more than a two-week inventory.

Production in key northern Ohio industries would not be seriously disrupted for 20 to 30 days. Eighty-five per cent of industrial plants have sufficient stocks to sustain operations over three weeks.

Steel producers in this district have from 40 to 60 days' supply. Stocks have been at this level for the past six months or more. A year ago stocks were equivalent to about three to four weeks' operations.

Utility companies' coal stocks at some plants are adequate to sustain operations for nearly a year. As a general rule they are substantially better off than other industrial groups.

Railroads have experienced an unusually heavy drain on coal stocks. In general their stocks are little changed from a year ago.

On April 28, 15,176 carloads of coal were waiting to be loaded into ore carriers, at ports between Toledo and Erie. This compares with 20,705 last year.

Speaking before the United States Chamber of Commerce meeting in New York last week, C. C. Dickinson, president, Dickinson Fuel Co., Charleston, W. Va., remarked that the record-breaking bituminous coal production has not been commended by either the government or the public.

"My opinion is that this public attitude arises in large measure from the archaic method of negotiating biennial wage agreements, whereby a meeting hall in New York is provided, scores of mine worker delegates are quartered in a nearby hotel and a lesser number of operators in another hotel, following which the leading light, lesser lights and acolytes are paraded on the stage day after day to make exaggerated, absurd, misleading and deceptive statements."

Mr. Dickinson said the bituminous industry in 1942 produced 580,000,000 tons despite manpower problems and shortages of materials and equipment.

Seventeen Strikes in Two Weeks Slow Chicago Output

A wave of strikes and work stoppages at Chicago district plants of the Carnegie-Illinois Steel Corp. have significantly interrupted production of steel for the manufacture of ordnance and other war equipment. Seventeen disturbances occurred over a two-week period.

All wildcat, or unauthorized, the shortest were merely sitdowns of approximately 15 or so minutes, the longest was of three-day duration, this on the 18-inch merchant mill at Gary with 150 workers.

Reasons given for the flare-ups varied from distaste for supervisors, dissatisfaction over existing incentive plans, de-

mand for such plans in departments in which there are none at present, to the complaint that grievances were not being settled speedily enough. The fact that the strikes were violations of union contracts were explained away by labor spokesmen on the ground that they were management provoked.

Affected were operations of the No. 1 and No. 5 open-hearth shops, 18-inch merchant mill at Gary steelworks; No. 3 finishing line and electrolytic tin line at Gary sheet and tin works; 35-inch blooming mill, 22-inch and 28-inch structural mills, and No. 3 billet dock at the South Chicago steel plant.

Foreman "Made Them Work Too Hard"; Employes Strike

Because the foreman "made them work too hard," workers in the billet yard at Bethlehem Steel Co.'s Lackawanna plant were on strike last week. Cessation of work in the billet yard disrupted schedules in other departments, adversely affecting war production. Workers voted to return to their jobs last Thursday.

Factory Employment Reaches Highest Level in History

Manufacturing employment increased 160,000 during February bringing the total to 16,000,000, highest level in the nation's history, National Industrial Conference Board reports. In 1939 only 10,000,000 were engaged in manufacturing activities.

Total employment in the country increased by 900,000 in February to 58,500,000, nearly 8,000,000 over the figure in February, 1942. About 5,000,000 were inducted into the armed services during the past year and slightly less than half that number were added in manufacturing plants.

Gains in factory employment were confined primarily to heavy industries, particularly transportation and machinery. Employment on construction projects decreased fully 200,000 during February.

Work-week increased 0.5 per cent to 44.5 hours in February, 3 per cent more than in February 1942, while average weekly earnings in manufacturing industries advanced 0.8 per cent to $43.91.

Longer working hours and higher hourly earnings resulted in earnings 17 per cent above February, 1942, and 53.8 per cent over 1929. The group's survey revealed that purchasing power of manufacturing wage earners was 21.2 per cent greater in February than in January, 1941, despite the 18.4 per cent increase in living costs over that period.

Cutback in Allotments for Armed Services To Be Necessary

HIGHER, not sustained, production of steel will be necessary to win the war, H. G. Batcheller, director, WPB Steel Division, warned the annual conference of the National Open Hearth Committee and the Blast Furnace and Raw Materials Committee of the American Institute of Mining and Metallurgical Engineers, Hotel Statler, Cleveland, April 29.

Mr. Batcheller said cutbacks will be necessary in the requested requirements of the armed services and the Maritime Commission.

"We have just received the estimates of requirements from the Army, the Navy, the Maritime Commission, lend-lease, and all the other claimant agencies to which we are providing steel."

"The requirements do not look unpleasant until you match them with what

H. G. BATCHELLER
Director, WPB Steel Division

our supply of steel is likely to be and then you get a much different picture. Third quarter supply will be under 18,000,000 tons.

"It looks as if we are going to fall short of providing steel that the agencies have requested in the third quarter of this year.

"The steel supply will permit the War Department, which is the largest consumer of steel among the claimant agencies, to receive only 86 per cent of the carbon steel the Army requires during that period. The Army's alloy request will be cut by a sixth.

"As you know, we are hearing reports, and some day one of them will be true, that the armies of the United States and its allies are going to invade the Continent of Europe. The Army will need steel to get into Europe and once there, will need a steady stream of steel products which can never stop until the war is won.

"Larger scale naval battles, with heavy losses on both sides, are bound to occur in the Pacific when we take the offensive against Japan. That means an ever-rising consumption of steel by the Navy.

"Yet this is what we are able to do for the Navy in the third quarter of this year. The steel supply will allow the Navy to get only 80 per cent of the carbon steel it needs and the Navy's requirement for alloy steel must be reduced 16 per cent.

"The Maritime Commission, which has long been an urgent customer for the steel made in American mills—last year the shipbuilding industry took first place as the largest steel consumer for the first time in the steel industry's history—wants more steel in the third quarter than we will be able to give its yards.

"We are giving the commission all the steel plates it is now able to use on the available ship way capacity, but the commission is asking us for more steel for the third quarter and says that it can use more steel to build ships to beat the submarines—but can not have more than 78 per cent of the tonnage requested for the third quarter. There is a limit to our steel supply.

"Since we must keep our Allies supplied with many things, steel being one of the more important, we must use considerable capacity to produce for the Office of Lend-Lease Administration.

"Regardless of the need for steel by the British and our other allies, a very sharp cut must be made in their stated requirements. Alloy steel lend-lease requirements will be reduced by 32 per cent.

"It is difficult to make these reductions when we know that many of the requirements are not overstatements. The steel could be used in the full amounts asked for if we could provide it. The plain fact is that we cannot, and therefore must distribute the steel we have in the places that need it most.

"You can see how much happier our position would be if you gentlemen could give us more steel out of existing equipment, while at the same time doing all in your own power to bring into production, the new capacity provided under the expansion program.

"This fall—since we cannot expect the railroads to continue passing miracles indefinitely in meeting the ever-rising war

traffic demand—the railroads are going to be in much greater trouble.

"Their equipment is wearing out. They are being pushed far beyond the limit of performance which can be reasonably expected. They are going to need more steel.

"Now here is what we are able to do for the railroad industries of the United States in the third quarter of this year. The ODT has asked for more than two million net tons of carbon steel for that period but their request must be cut by 40 per cent. Only 60 per cent of the steel the ODT wants in the third quarter can be provided. The railroads will have to get along. Yet we know they need more steel.

"Of the six largest steel consumers, the railroads in the third quarter of 1943 relatively are going to take the largest reduction in steel requirements."

"Americans Too Complacent"

In surveying the steel situation in this seventeenth month of the war, said Mr. Batcheller, "it seems to me that we are approaching a period in which a recurrence of that typically American disease—complacency—is again likely to threaten us in its various forms and, at the very least, lengthen the war and the increase in loss of lives.

"There are various threats to American industrial production, some tangible and open to direct solutions. This kind can readily be understood and diagnosed. The other threats to American industrial production, the intangible variety, are more difficult to deal with.

"Here are some of these intangible threats and dangers.

"1. A feeling among us that since we have produced enough of some war material, such as shells, bombs, tanks and certain other items, we can slow down production.

"2. A belief that if we work too hard there will be nothing left to do, hence it is better to take it easier and spread out and so stabilize the work.

"3. Over-preoccupation with what the draft boards are going to do, such as putting your skilled workers on the farm, or in the armed forces or somewhere else.

"4. Fears that the rate of production in some plants should be altered to accommodate the thousands of women going into industry.

"5. Belief that since ceilings and taxes have made big money, whether salaries or wages, we might as well 'take it easier.'

"6. Irritation over government controls on production and distribution to the extent that we say: 'It isn't worth it. I can't stand this interference with the way I run my plant. I can't do business with Washington.'

"7. Inability to understand our own industrial stake in the war which is, in short, the right to talk, to pray, to work and read without interference by some dictator."

Monopoly Threat Serious, Says Antitrust Unit Head

Tom C. Clark, who recently succeeded Thurman L. Arnold as assistant attorney general of the United States, speaking recently before the American Business Congress in New York, declared the present objective of the Antitrust Division is to prevent monopoly from destroying small business. The situation is serious, he said, because at the beginning of the war effort 175,000 companies were providing 70 per cent of the nation's manufacturing output and 100 companies were producing 30 per cent, whereas now 100 corporations hold 70 per cent of the war and essential civilian contracts while 175,000 companies hold 30 per cent.

"After the war", he said, "the enormous industrial plants created for war purposes must be converted to peacetime production. The danger America faces is that these plants will not be in competition and that general access to raw materials and markets upon which depends the peace and prosperity of the peoples of the world will be controlled by a small group which will set up its own trade barriers by private agreements, commonly known as cartels. We must not permit the reestablishment of the cartel system. It is the purpose of antitrust to prevent such a move and do it now."

He assured his listeners that there will be no witch-hunting, no uprooting of American customs or traditions, but warned that there would be practical, swift, hard-hitting law enforcement. As an instance, he cited the Antitrust Division's recent action in breaking up a conspiracy among New York department stores to control advertising rates in the *New York Times* by discontinuing the use of space in that paper.

Warns Businessmen To Plan War Plant Conversion

To the Committee for Economic Development recently, Jesse H. Jones reported Defense Plant Corp. has built and owns more than 1500 plants for manufacture of all sorts of basic materials and products. Congress, he said, will have to decide how these properties are to be operated in peacetime, and it will need the advice of every thinking man.

"In my view," he said, "Congress can be relied upon if those of us in business will be honest and frank with Congress. It will be bad for the country, and each and everyone of us, if any group attempts to take selfish advantage in the transformation we will have to face.

"One of your big jobs is to work out plans that will be acceptable to Congress so that we will not have to charge all of the billions to the cost of war.

"This much is certain, that if the businessmen of the country, either through the Committee for Economic Development or in some other way, do not have concrete, practical suggestions for the conversion of industry from war to peace, government will have to make the decisions. Under such circumstances what the government does may not be to your liking. In that event we would have only ourselves to blame, for it seems to me that, if the past ten years have taught us anything, it is that business cannot merely express dislike for what government does. It must be prepared to offer practical solutions based not on privilege—but service and the common welfare."

Program for Steel Institute's Meeting May 27 Outlined

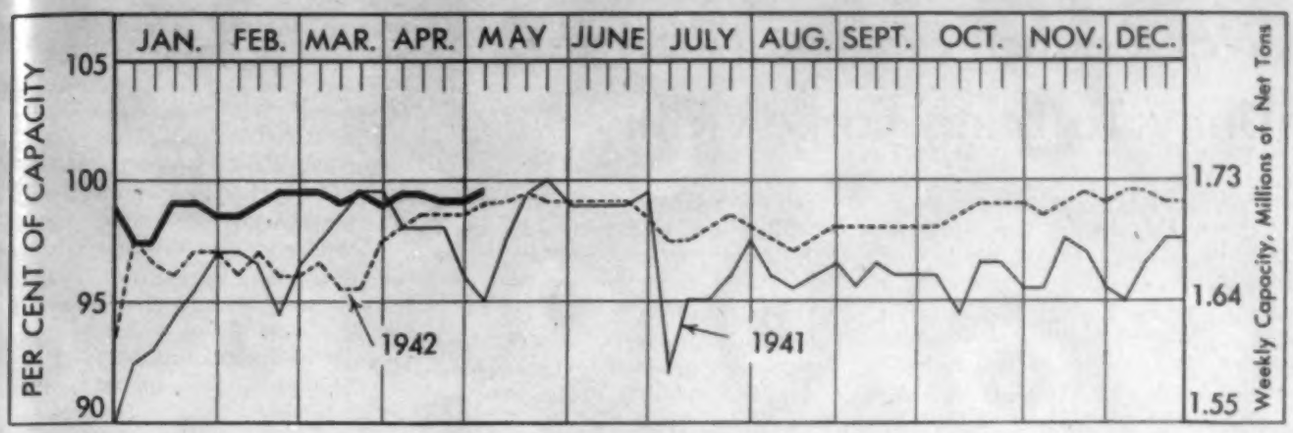
Program of the fifty-second general meeting of American Iron and Steel Institute in New York, May 27, will feature addresses by Walter S. Tower, Institute president, Vice Admiral S. M. Robinson, Office of Procurement and Materials, Navy Department, and Major General L. H. Campbell Jr., Chief of Ordnance, War Department.

All three addresses will be delivered at the morning session. In the afternoon, the meeting will be divided into two general sessions, one on technical subjects, the other on industrial relations.

The technical session will be divided into three separate discussions, each with the general theme "The Steel Industry's Contribution to the War Effort." One part will deal with the expansion program and general production problems; another with steelmaking practices; the third will cover materials conservation.

At the industrial relations session, a series of short papers will be presented by members of the institute's industrial relations committee. These papers will deal with several phases of industrial relations activities, including discussion of today's war manpower problems.

National Bureau of Standards has advised the Corps of Engineers of the Army that bessemer steel is ideal for use in making landing mats for airplane runways.



STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1943	7,408	6,811	7,670	....	....	....	....	....	....	....	....	....
1942	7,124	6,521	7,392	7,122	7,386	7,022	7,148	7,233	7,067	7,584	7,184	7,303
1941	6,922	6,230	7,124	6,754	7,044	6,792	6,812	6,997	6,811	7,236	6,960	7,150

PIG IRON PRODUCTION

1943	5,194	4,766	5,314	....	....	....	....	....	....	....	....	....
1942	4,983	4,500	5,055	4,896	5,073	4,935	5,051	5,009	4,937	5,236	5,083	5,201
1941	4,666	4,206	4,702	4,340	4,596	4,551	4,766	4,784	4,721	4,860	4,707	5,014

April Plate Output Off 60,000 to 70,000 Tons

While the War Production Board made no official estimates, it was believed in Washington last week that production of steel plates in April was 60,000 to 70,000 tons less than the output in March, which was 1,167,679 tons.

At a press conference in New York following presentation of the United States Steel Corp.'s quarterly report (p. 66) Irvin S. Olds, chairman, stated that plate output at Carnegie-Illinois Steel Corp. plants dropped 12½ per cent in the four weeks following March 18, compared with the preceding four weeks, as a result of special care in testing. The great part of this decline was at Irvin works, where production was reduced mainly because of lack of storage facilities, while considerable tonnage was retested. For the period from March 20 to April 17, production at Irvin was off 28 per cent, compared with the preceding four weeks. At Gary, where another strip mill had been converted to plates, production, however, was off only 8½ per cent.

Irvin, he said, was never intended as a plate mill. It had no facilities for cooling or storing plates; and to have added these facilities would have cost $5,000,000 or $6,000,000 and six months delay. Rather than lose time and take equipment that might be badly needed elsewhere, Carnegie at its own expense made such conversions as were absolutely necessary in 37 days. The pressure was to get out plates of suitable quality for ship construction, and that is what the company has been doing, he declared. It was this pressure "that may have caused inspectors to cut corners in certain testing procedure, as disclosed before the Truman committee."

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended May 1	Change	Same week 1942	Same week 1941
Pittsburgh	101	+2.5	95.5	93
Chicago	99	+0.5	105	96
Eastern Pa.	94	None	94	95
Youngstown	95	None	94	89
Wheeling	93	+4.5	82.5	88
Cleveland	95	None	93.5	92.5
Buffalo	93	None	93	90.5
Birmingham	100	None	95	90
New England	95	None	93	95
Cincinnati	91	—6	89	90.5
St. Louis	93	None	88	98
Detroit	96	None	92	88
Average	99½	+0.5	*99	*95

*Computed on bases of steelmaking capacity as of those dates.

Interchange of Steel by Producers Permitted

Deliveries of steel from one producer to another, when the purchasing producer resells it at the mill price together with steel of his own production, were authorized by the WPB in Direction No. 6 under CMP Regulation No. 1. Orders on which such deliveries are made must be endorsed "PI," meaning "Producers Interchangeable".

A controlled materials producer may reject such orders, but may not discriminate between customers in rejecting or accepting them. Such orders are not deemed authorized controlled material orders until accepted by the producer.

Ingot Rate 99½ Per Cent, Up ½-Point

Production of open-hearth, bessemer and electric furnace ingots last week rose ½-point to 99½ per cent. Three districts advanced, one declined and eight were unchanged. A year ago the rate was 99 per cent; two years ago it was 95 per cent, both based on capacities as of those dates.

Carnegie-Illinois Steel Corp. blew in its Ohio No. 4 blast furnace at Youngstown April 25 and blew out its No. 2 stack at Clairton, Pa., April 27. Bethlehem Steel Co. has its new stack at Lackawanna Works ready to light, the date depending on the coal strike situation. Hanna Furnace Corp. expects to relight its furnace at Buffalo during May, relining being practically completed.

Consumers' Scrap Inventories Continue Decline in February

Iron and steel scrap shipments to consuming mills in January and February were 31.3 per cent of the first half-year quota of 1943, the Salvage Division, War Production Board, announced last week.

February shipments of 1,195,000 net tons were 83,000 tons below the January shipments. Consumers inventories continued to decline in February, dropping 24,000 tons from January to 6,205,000. California led with 42.2 per cent of the quota reached by the end of February. Weather conditions interfered with shipments in the northern states.

War Council Stresses Need for Unity To Bring Early Victory

UNIFIED American economy for the duration and postwar period was the keynote at the thirty-first annual meeting of the Chamber of Commerce of the United States, New York, April 27-29. With speakers from industry, labor, agriculture, government and the services, the sessions were part of a war council, stressing unity for an early victory and a sound approach to postwar problems.

Army and Navy requirements, making ends meet in business, agriculture and civilian needs and postwar democracy were general subjects under which manpower, war contracts, foreign trade, civilian supplies, government finance, transportation, fuels and power were discussed. As remarked by Owen D. Young, chairman of the board, General Electric Co., "an outstanding spirit of co-operation from all elements arises primarily from the great pressures of today, but the unity apparent on fundamentals confronting the nation is gratifying."

Both management and labor resist undue governmental interference with the operation of every-day affairs, declared William Green, president, American Federation of Labor. "The sooner we can return the operations of government to their normal and necessary sphere the better for our American democracy," he said.

Advocate Return to Normalcy

E. A. O'Neal, president, American Farm Bureau Federation, asserted any attempt to maintain an artificially inflated price and wage structure is bound to fail, "with results that will threaten the survival of our cherished institutions of democracy."

Agency for civilian supply should be integrated as a part of the centralized control of the war effort, and should not be divorced from that effort, delegates representing 1400 chambers of commerce asserted in one resolution. Small business war production contracts should be spread over a still broader base. Effective national production for war requires freedom of management to operate without unreasonable government interference.

The chamber continues its advocacy of the advantages of the private-enterprise system and seeks wide support for restoration of the rights of private enterprise surrendered during the war. Neither war agencies nor any other public agencies should operate war-created and federally-owned facilities in competition with private enterprise. The present renegotiation statute covering war contracts is considered inequitable.

Practice of making subsidy payments through the operation of government corporations should be stopped, was the sense of another resolution that was adopted. Subsidies and equivalent provisions provided in the years of depression should now be terminated.

National Service Law Opposed

R. Conrad Cooper, assistant vice president, Wheeling Steel Corp., Wheeling, W. Va., and Clinton S. Golden, assistant to the president, CIO, spoke on manpower. Major aspects of the problem are beset with all kinds of pressures, Mr. Cooper declared, with individuals and groups losing sight of the problems of others; unified thinking is needed.

Opposing proposed national service legislation, Mr. Golden declared no military or civilian agency of the government knows with any degree of precision how much manpower is needed, where or when. There is not the necessary co-ordination of plans, work and activities. Not more manpower legislation, but better utilization of manpower is needed, he said.

Disagreeing with an earlier statement by Paul V. McNutt, WMC chairman, that 5,000,000 workers for war industries could be mobilized voluntarily by the end of 1943, James W. Wadsworth Jr., congressman, New York, said orderly distribution of such a number could only be attained by legislation. He stated the element of compulsion had already entered the supposed voluntary plan through threatening directives.

Clarence L. Collens, president, Reliance Electric & Engineering Co., Cleveland, said that prompt liquidation of frozen assets and of all liabilities and loans, whether V-loans or otherwise, is a prerequisite to a prompt and orderly return to peace-time economy.

Stressing the importance of the Navy in keeping the seaways open to transportation, Admiral Ernest J. King, Commander-in-Chief, United States fleet, said the submarine menace may be expected to be brought under control in four to six months. He explained that "under control" does not mean it is going to be stopped, but kept down to such volume that the increase in shipbuilding will build up the available tonnage so more war materials can be carried overseas where the war is being fought.

The original goal for 16,000,000 tons of shipping this year has been raised to nearer 19,000,000 tons, said Admiral Emory S. Land, chairman, Maritime Commission. For the ultimate invasion of Nazi-held territory the United States will construct approximately 2000 ships in 1943.

William L. Batt, vice chairman in charge of international supply, cited savings through activities of WPB-5 conservation division, including:

Tipping of high-speed cutting tools is being encouraged in plants throughout the country in an effort to cut down wastage; approximately 8000 tons of zinc per year have been saved in changing the tops on mason jars from zinc to steel; cast iron for stamped steel closures have been developed for use on gasoline drums, replacing 4000 tons of high grade die castings; production of the new penny will require only about 200 tons of zinc, as compared with an original estimate of 4500 tons; during the past six months, approximately 500,000 pounds of rubber have been conserved through the use of wool felt in the manufacture of washers, gaskets and a number of similar items; during the past winter, approximately 30,000 tons of cast iron were saved by the production of approximately 1,000,000 ceramic fireplace grates.

Capitalism a "Living Process"

When compared with totalitarian, collectivism, state capitalism and other related systems, there is no reason to apologize for our competitive capitalism, declared Eric A. Johnson, president, Chamber of Commerce of the United States.

"The pride that we take in the American capitalist system, however, does not imply that we fail to acknowledge shortcomings or that we demand uncritical acceptance of the philosophy of American business. On the contrary, we regard the flexibility of our economic setup, its capacity for evolving new methods to meet new conditions, as an important source of its strength. Unlike the other two systems, it is not a rigid and unchanging pattern, but a living process, dynamic, constantly evolving, learning by trial and error, seeking and finding adjustments.

"However, it will remain alive and dynamic only as long as we make sure that the fountainheads of its strength are not blocked or polluted. What are those fountainheads? They are, in the first place, the right and the opportunity for every individual to take the risks and reap the rewards of indivdiual initiative.

(*Please turn to Page* 168)

Converted Industries Making More War Goods "Than Ever Visualized"

SECOND War Production Foundry Congress and forty-seventh annual convention of the American Foundrymen's Association opened in Hotel Jefferson, St. Louis, April 28 with a program designed to extend the "know-how" of war castings production throughout the industry. Deficiencies of men, materials and machines were given special attention in group sessions where experts discussed innovations in foundry practice to increase production despite these limitations. More than 2500 foundrymen were present.

Two of the outstanding features of the three-day program were the first A.F.A. Foundation lecture by John W. Bolton, director of research and testing, The Lunkenheimer Co., Cincinnati, and the first section of a series of lectures on gating and risering by W. G. Reichert, Reichert Engineering Co., Newark, N. J. Mr. Bolton's subject was "Foundry Metallurgy and the Castings Industry." Col. Merle H. Davis, district chief, St. Louis Ordnance District, on Wednesday morning delivered the address to the opening session on "Trends in the Use of Ordnance Items."

Colonel Davis said that "in one converted industry after another we are obtaining greater war production than anyone had ever visualized because we did not reckon on versatility of a metalworking industry fresh out of an economic depression and underestimated results of the Ordnance Department's planning in the past 20 years for industrial conversion in event of war. As a result, and despite the fact that 90 per cent of Army Ordnance prime contractors are curtailed either below their maximum production capacity or below contracted capacity, ordnance items are backing up at the seaboards and in depots."

Other Problems To Be Met

Some problems other than production still prevail. They include "constant improvement necessary in quality of ordnance, scarcities of raw materials and manpower and necessity of design revisions dictated by changing tactics of war."

Discussing various types of castings, he said he believed the bessemer process was likely to be reinstated in federal specifications for steel castings since the Ordnance Department expects to recommend such reinstatement.

Association president Forbes, in his annual address, pointed out that despite past progress of the industry, much fundamental research in foundry practice remains to be completed and translated into actual operation and into improved castings. He said over $50,000 had been subscribed toward the association foundation being created for furthering this work.

Rufus F. Harrington, foundry superintendent, Hunt-Spiller Mfg. Co., Boston, was awarded the John A. Penton Gold Medal of A.F.A. for "outstanding pioneering work in foundry sand control." In addition to his long service on the Foundry Sand Research Committee and numerous subcommittees, Mr. Harrington is an active member of the American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers, American Society for Metals, Army Ordnance Association and War Products Advisory Committee. He is a past president of the New England Foundrymen's Association and past chairman of the Boston chapter, American Society for Metals.

L. C. WILSON
Elected president, American Foundrymen's Association

For metallurgical and shop practice contributions to the malleable iron section of the foundry industry, Carl F. Joseph, research metallurgist of the Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., received the William H. McFadden Gold Medal of A.F.A. He has served on many committees of the Malleable Division and at present is a member of the advisory committee and chairman of the program and papers committee of that division.

Honorary life membership in the association was conferred on Stanley W. Brinson, master molder, Norfolk Navy Yard, Portsmouth, Va., for his valuable contributions to the industry on steel foundry practice. Mr. Brinson's rank is equivalent to foundry superintendent in industry.

Meetings of the various industry branches were planned to provide as much information as possible because of the limited time which production men could be away from their plants. The congress compressed into three days a program which ordinarily would have required a week. Sessions of the malleable, aluminum and magnesium foundrymen were held on the first two days; patternmakers met on the second day; brass, bronze and steel castings groups held sessions on the second and third days, and gray iron subjects were presented on all three days. This year, for the first time, a complete program was presented for producers of light alloy castings.

Wilson New President

Elected president of the association was L. C. Wilson, general manager Reading Steel Casting Division, American Chain & Cable Co. Inc., reading Pa., who moved up from vice presidency of A.F.A. He has been a member for many years of the Steel Division Advisory Committee, chairman of that division's committee on impact testing and chairman of a number of convention sessions. He was a director of the American Foundrymen's Association from 1926 through 1928.

Ralph J. Teetor, elected vice president of the association is president of Cadillac Malleable Iron Co., Cadillac Mich. His chief interests and activities have centered in the Malleable Division of A.F.A. where he has served as committeeman. From 1933 to 1935 he was a director of the association.

Resignation of C. E. Westover as executive vice president and treasurer of the association was announced. He will be associated with Sandusky Foundry & Machine Co., Sandusky, O.

New directors elected for three-year terms include Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va.; Roy M. Jacobs, president, Standard Brass Works, Milwaukee; Harry Reitinger, resident manager, United States Pipe & Foundry Co., Burlington, N. J.; William B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, and Duncan P. Forbes, president, Gunite Foundries Co., Rockford, Ill., and retiring president of the association.

Orders were received in March for 1029 steel boilers, compared with 733 in February and 2699 in March, 1942, according to the Bureau of the Census.

Increased Labor Costs, Taxes Cut Steel Corp's Quarter Net $4,000,000

NET earnings of United States Steel Corp., New York, for first quarter 1943, were $4,000,000 less than the total for the corresponding period of 1942, due largely to increased labor costs and taxes.

Report for the three months ended March 31 shows net of $15,406,597, after interest, depreciation, depletion, quarterly provision for pensions, reserves for contingencies and federal income and excess profits taxes, and compares with revised figure for first quarter last year exceeding $19,000,000. Corporation previously reported $27,921,534, but recomputation of income tax to conform to the 1942 federal Revenue Act and allotment to this period of its share of additional payments to the pension fund narrowed the difference between earnings of the two quarters.

In the first three months this year, sales and revenues amounted to $439,757,709, against $432,421,560 a year previous. Wages, salaries, social security taxes and pensions totaled $206,821,102, an increase of $34,526,653, while average number of employes rose from 325,530 on March 31, 1942 to 335,868. This gain was attributed to increased activity at corporation's shipyards.

Assets $28,000,000 Greater

Net current assets were $537,609,059 in latest quarter, after deduction for current dividend. This contrasts with $509,458,949 at March 31 a year ago.

Capital expenditures for additions to and improvement of plants and equipment were approximately $17,000,000. On March 31, 1943, unexpended balances for property additions and replacements amounted to approximately $130,000,000. During the first quarter, $2,445,788 of capital obligations were retired. Total long-term debt outstanding at the close of the period was $149,463,596.

Corporation's ingot production is now around 98 per cent, on an average held throughout first quarter. It has five furnaces down for relining. Ingot capacity, as of March 31, had increased 598,000 net tons since Jan. 1, 1942, bringing the rating up to 31,151,100 tons. It was also revealed that there has been a downward revision of 449,020 net tons in the shipments of 21,064,157 tons of finished steel products for 1942, as reported in January.

Unexpended balances for property additions and replacements of approximately $130,000,000 included such projects as electrolytic tinning lines, coal mine development, further work at Gary and Homestead, a little at Worcester, Mass., considerable work for the American Steel & Wire Co. at Chicago, and some at Pittsburg, Calif.

One tinning line is now in operation at Gary and Birmingham, respectively, and two at Irvin. Five more lines are to be put in operation, with one each at Gary and Birmingham expected to start production about Aug. 1.

Bethlehem Earns $6,228,693; Executives Reduce Bonuses

Bethlehem Steel Corp.'s report for the first three months of 1943 showed profit of $6,288,693, after provision of $28,880,000 for federal income and excess profits taxes, equal to $1.54 a common share. This compares with 1942 first quarter net income of $6,140,688, or $1.51 a share, after federal tax provision of $24,190,000.

Consolidated income account for the most recent period shows net billings as $452,715,168, against $305,653,318 in like quarter last year. Provision for depreciation and depletion totaled $9,056,824 compared with $8,948,390.

At the close of the quarter, company's ingot production rate was at 100 per cent of capacity. In the final quarter of 1942 the rate was 97.9 per cent, while the rate for the March quarter of 1942 was 98 per cent.

Voluntary reduction of incentive compensation for Bethlehem executives which will result in a decrease in 1943 of 45 per cent of the amount distributable to them was announced by Eugene Grace, chairman of the board. He said his own participation, under the plan adopted by stockholders in 1936, is thereby reduced 80 per cent and his salary cut from $180,000 to $150,000 a year. As compared with total compensation of $537,724 received by Mr. Grace in 1941 and 1942, the new rates, on the basis of a $6 dividend on the common stock, will result in total compensation for him in 1943 of $221,645, a reduction of $316,079, or 58.8 per cent.

Inland Steel Co.

First quarter net earnings of Inland Steel Co., Chicago, amounted to $2,796,321, equivalent to $1.71 per share, compared with $2,689,090, or $1.65 per share, for the first three months of 1942. Company provided $2,061,191 for depreciation and depletion in the latest period, against $1,858,045 a year ago. Provision for federal income and excess profits taxes was $5,100,000 for this quarter, compared with $6,386,000 in first quarter, 1942. Capital stock dividend of $1 per share was declared, payable June 1 to stock of record May 14.

Edward L. Ryerson, chairman, stated in report that Inland mills maintained operations at 107.4 per cent of capacity during the quarter against 103.4 per cent for the 1942 quarter and 102.3 per cent average for last year because of generally favorable operating conditions and adequate scrap and hot metal supply.

Youngstown Sheet & Tube Co.

Youngstown Sheet & Tube Co., Youngstown, O., earned net profit of $2,147,023 for the quarter ending March 31, after charges and federal income and excess profits taxes. Net was equal to $1.15 a common share and compares with $2,576,579, or $1.41 a share, for the first quarter last year.

Jones & Laughlin Steel Corp.

Jones & Laughlin Steel Corp., Pittsburgh, earned first quarter net income of $2,399,369, after providing $6,398,050 for federal income and excess profits taxes, equal to $1.04 a share on 1,602,467 common shares, after quarterly dividend requirements on class A and B preferred. This compares with $2,491,718, or $1.46 a common share on 1,248,000 shares in like quarter of 1942. Provision for taxes in latest period amounted to $6,398,050, against $5,420,000 for 1942 quarter.

Midvale Co.

Net profit of the Midvale Co., Philadelphia, for 12 month ended March 31 amounted to $3,730,218 after all charges but subject to renegotiation. Included was $1,515,000 added to contingency reserve; $14,498,600 was provided for federal and state income taxes. Net is equal to $6.22 a share and compares with $5.01 a share on $3,007,492 for previous year.

Sharon Steel Corp.

March quarter net income of Sharon Steel Corp., Sharon, Pa., was $445,564, after reserve of $150,000 for postwar contingencies, equal to 94 cents a share on common. This compares with $250,302, or 45 cents a share, in 1942 quarter. Federal and state income and excess profits taxes amounted to $1,593,000 after deducting postwar credit of

(*Please turn to Page* 151)

Redistribution of Immobilized Tools Urged by War Production Boar

REDISTRIBUTION of tools immobilized in industrial plants was urged upon members of the Industrial Supply Distributor's advisory committee at its initial meeting with representatives of the Wholesale and Retail Trade Division.

Large numbers of tools lie unused in all types of factories and plants as a result of such factors as changes in product design, completion of war contracts, and, in some cases, over-buying on the part of purchasing agents, it was pointed out. By setting up machinery whereby these tools can be redirected into plants which have immediate need of them, industrial supply distributors will perform an important service to war production, WPB officials present at the meeting declared.

A related problem—that of supplying an adequate quantity of hand tools for essential civilian use—also was discussed. The suggestion was made that part of the present production of hand tools be allocated to distributors, who in turn could direct them to retail outlets in areas where the greatest legitimate need exists.

New Form Provided for Aluminum Ingot Producers

War Production Board has issued a new form, CMP-23, which will be used by primary producers and secondary smelters of aluminum to report monthly shipments of and unfilled orders for aluminum ingots.

Two copies of this report are to be filed for each month by the tenth day of the following month. The first report, covering April shipments and unfilled orders at the end of that month, must be filed with the Aluminum and Magnesium Division by May 10.

The new form will replace the following reports now filed: Monthly confirmatory form, PD-26A; and section "E" of form PD-272.

Orders for aluminum castings, approved on form PD-26A for delivery during a month prior to April, expired on April 30, if delivery was not completed within the time limit specified on the form. However, such orders may be reapproved by filing a supplemental application of form PD-26A, if additional allocations of primary metal are not involved. Assignment of authorized controlled material order status to April deliveries approved on PD-26A will permit delivery until May 31.

Orders for controlled materials placed before the purchaser has received his allotments may be converted into controlled materials orders when allotments are received by furnishing the supplier with duplicate copies of the purchase orders, certified as provided in CMP regulations. Orders so converted must be treated as authorized controlled materials orders as of the date on which the certification, including the allotment number, is furnished the supplier, not as of the date on which the order was first placed.

Industrial Oxygen Shortage To Continue Until 1944

The present shortage of industrial oxygen will continue until early 1944, when it is expected that new plant facilities should be completed, it was stated at a recent meeting of the Oxygen and Acetylene Advisory Committee in Washington.

Shortage of calcium carbide, now under allocation, probably will prevail throughout 1943. However, several new production facilities are scheduled for completion during the next few months.

War needs for acetyelne, a gas generated from calcium carbide, and demands for oxygen continue on a peak basis and it is imperative that all consumers of these gases adopt rigid conservation measures.

Program Vice Chairman's Office Reorganized

WPB Program Vice Chairman J. A. Krug last week announced reorganization of his department to include four bureaus—Program, Production Controls, Orders and Regulations, and Distribution.

Controlled Materials Plan Division is removed from the Distribution Bureau and placed in the new Production Controls bureau, headed by Harold Boeschenstein, formerly director of the CMP Division. Mr. Boeschenstein is succeeded in the latter capacity by Walter C. Skuce, who has been deputy director of the division. Also in the Production Controls Bureau is a new Scheduling Division under Harry Zellman. The Distribution Bureau, headed by Byron C. Heacock, is now made up of the Compliance, Controller, and Canadian Divisions. A chief of the Orders and Regulations Bureau is still to be appointed.

The Stockpiling and Transportation Division under Dr. W. Y. Elliott has been transferred to the Program Bureau. Otherwise this bureau of which John Fennelly is director, remains unchanged.

Lee Marshall, formerly special assistant to Chairman Donald M. Nelson, will serve as food consultant in the program vice chairman's office.

Mr. Zellman, who will direct the scheduling activities of the Office of Program Vice Chairman, is on leave from General Electric Co., Schenectady.

WPB Unit To Redistribute Frozen Utility Equipment

A new unit of the War Production Board has been established for the redistribution of utility equipment to industrial users with proper priorities to facilitate handling of such material frozen by WPB orders. Eventually 12 such units will be established, one for each of the 12 WPB districts. These organizations will be known as Regional Utility Inventory Control Offices. The first office has been established in the First National Bank building, Pittsburgh, under the direction of R. C. Wenz, who is assistant general purchasing agent for the Philadelphia Co.

Use of Copper in Automotive Maintenance Units Restricted

Copper for automotive maintenance equipment has been placed under the same restrictions as steel, aluminum and other critical material in the War Production Board's amended Order L-270. The order also restricts use of other critical materials in this type of equipment for the armed forces and other fighting services. Order M-9-c, as amended, transfers copper control for such use to L-270, effective April 30.

WPB Conservation Division Divided Into Two Branches

War Production Board's Conservation Division last week was divided into two primary branches, materials and products, to establish the parallel relationship between materials conservation and conservation in end-products.

The division will not change its operation functions under the new set-up. Materials substitution, product specifications and product simplification will remain primary operations but will henceforth be projected across two branches.

Red Cross War Fund in recent drive received a total of $556,000 in contributions from the employes and management of the Carnegie-Illinois Steel Corp., a U. S. Steel Corp. subsidiary.

WINDOWS of WASHINGTON

Plot Against Beryllium?

Speaking before the House April 22, Rep. B. Carroll Reece, Tennessee, charged that Andrew J. Gahagan has been "summarily discharged" from the Beryllium Corp. of America through the influence of copper interests who desire to eliminate the competition of beryllium copper. Because of the importance of beryllium in the war effort, he urged the House Military Affairs Committee to conduct an investigation to ascertain whether German-controlled or American-controlled groups are sabotaging the war effort by discouraging use of beryllium.

No Capital Dimout

New Yorkers visiting the national capital are always amazed to find the city brilliantly illuminated at night. This is in sharp contrast with the dimout in New York, with its accompanying automobile accidents and attacks by thugs.

Reason is that New York is directly on the seaboard so that the glow from its lighting system shows up ships in silhouette and makes them good targets for submarines. Washington is sufficiently inland to permit ample warning should enemy ships invade our shores.

Army officers speaking before groups of air raid wardens say frankly they expect air raids. They do not expect sustained air attack for the reason the Axis powers cannot spare planes for such a campaign. What they expect is token raids—aimed at shaking morale. Washington, it is believed, would be an ideal target for a token raid—for here it is that all of the decisions having to do with waging war are made. In the event of sustained air raiding, on the other hand, general belief is that other targets would serve the enemy's purpose better. One such target, for example, might be an engine plant in Connecticut.

The well organized air raid protection program in the national capital which functioned so actively last year has broken down. Inspections of residences and other buildings by air raid wardens were discontinued several months ago. The Army contends there is no justification for such indifference.

Dam for Paper Flood

One subject on which Congress is getting more touchy is the vast amount of printed and mimeographed material which government departments and agencies issue. One congressman remarks he gets so many of these that the loss of time required in reading them makes it impossible for him to fufill his "constitutional duties". House Appropriation Committee has proposed to assume control of this condition by taking the franking privilege away from these bureaus and forcing them to pay postage on material sent through the mails. If this were done, the various departments and agencies would be forced to justify the item of postage in the budgets they present each year for approval.

TOO MANY PLANNERS

A matter that puzzles Congress is how to organize planning for the postwar economy. In addition to the National Resources Planning Board, practically every federal agency has some sort of a planning group. The Twentieth Century Fund notes no fewer than 157 agencies and departments have planning organizations. Congress would like to centralize all planning in one place, where it could be handled in close contact with Congress.

When Congressman Dirksen, Illinois, heard the National Labor Relations Board had a planner, he expressed wonder as to "what sort of planning that would be." Most congressmen feel the same way when they think about government planning in so many different places and they are trying hard to find a practical solution to the problem. One member recently remarked that he was afraid that if the thing is not brought under control we will find ourselves with a "great Labyrinthine maze" on our hands —and no plan that is tangible and workable.

Rampaging Missouri

Missouri river likely will be the next important stream to be fitted out with a chain of dams and reservoirs. When that river went on a rampage early in April the city of Pierre, South Dakota's capital, was isolated, the great municipal airport at Omaha was three feet under water, thousands of people were made homeless and a vast amount of damage resulted.

The Missouri usually is an important contributor to Mississippi river floods, and hence presents a problem of national interest. The Missouri, from the Fort Peck dam in Montana, to Sioux City, Iowa, is 1060 miles long, which contrasts with 980 miles for the Ohio river, between Pittsburgh and its mouth in the Mississippi, and 650 miles for the Tennessee river, from Knoxville, Tenn., to its mouth in the Mississippi.

Rep. Francis Case, South Dakota, is pushing the matter in the House.

Vitamize Dehydrated Food

A representative of the Australian government who read the two-part article on food dehydration published in STEEL of April 5 and 12 remarked that Australia evidently is ahead of the United States in this development. Australia is adding vitamins to dehydrated vegetables and now is about to add dehydrated alfalfa to breakfast cereals for the same purpose. The natural vitamin content of orange juice is being enriched in that country. Australia manufactures most of the equipment which her food industries use.

Retail Sales Shift

Many manufacturers will be interested to know retail sales per capita are increasing in the growing industrial centers of the South, the Rocky Mountain area and the Pacific Coast region. This is due to greater purchasing power of family units, also to more urbanization and specialization, the Bureau of the Census finds.

Archives in Cardboard

Here is something more for steel producers to think about. The National Archives formerly bought steel cases in large numbers to file various papers and records. In the 1942-1943 fiscal year it has purchased 250,000 cardboard boxes, at a considerably lower price than it formerly paid for steel boxes. The agency finds that they wear well considering the fact they are not subject to much handling and it may continue to buy cardboard boxes in the future.

The National Archives building, incidentally, is considered one of the most nearly bombproof buildings in Washington—that is, from the standpoint of guarding against destruction of precious national records. It has been split up into four zones, with relative degrees of safety, and some 14,000 cubic feet of records have been moved around so that those of most value are in the safest places. All nitrate film has been moved out of the building to a safe place to eliminate the explosion hazard.

Indian Anthropology

Smithsonian Institution is preparing a handbook on South American Indians—their habits, customs and the way they live. Underway 2½ years, it is expected to be ready for publication late in 1944. It will be the first anthropology of its type and while compiled primarily for general purposes of education is expected to be of great assistance to American manufacturers interested in selling their products to South America.

New FITCHBURG ADJUSTABLE "TYPE C"

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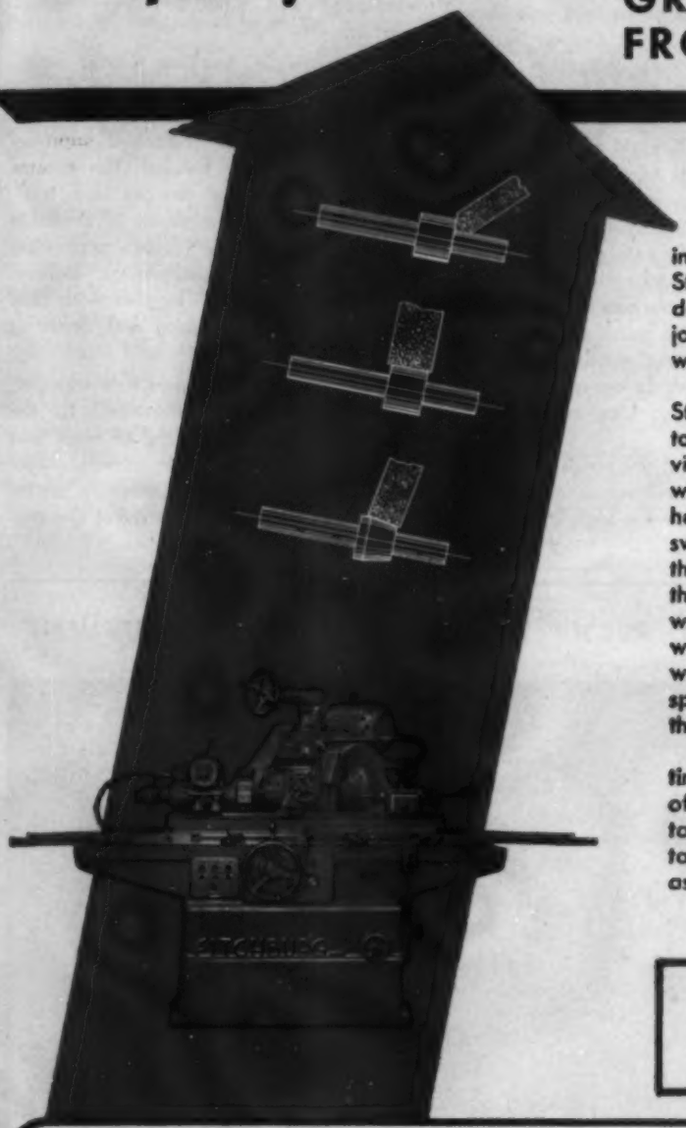

The Fitchburg Adjustable "Type C" Angular Head Grinding Machine is another single application of the Fitchburg Standard Bowgage Wheelhead Unit. The "Type C" is designed to handle a wide range, and a number of types of jobs. In finding ways to cut your grinding time and costs it will pay to consider what this machine can do.

This newest of Fitchburg plain cylindrical grinders has a Standard Wheelhead Unit mounted so that it may be located to grind from 0 degrees up to a 45-degree angle. Previously angular head grinding machines have been equipped with fixed heads for single purpose grinding. The Bowgage head on the Fitchburg "Type C" is adjustable and can be swivelled to various positions for standard plain grinding, thus providing greater grinding utility. The head goes through a completely automatic cycle — rapid traverse to work, correct feed, grinding dwell and rapid return. The workhead is adjustable for various lengths of work and the work spindle can be equipped for single or variable work speeds. The trueing device is hand operated and mounted on the work table.

The Fitchburg "Type C" grinder is designed to meet war time production speed and maintain highest efficiency. Ease of operation is assured by centralized controls. In every detail it meets all the requirements of plain cylindrical and taper grinding — in large or small lots of work, with assured accuracy and fine finish, at low cost.

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Potentials Present for "Era of Unparalleled Peacetime Prosperity"

MAJOR potentials for an "era of unparalleled peacetime prosperity for the United States" are described in *Markets After the War*, a volume just released by the Bureau of Foreign and Domestic Commerce, Washington.

The potentials: Employment on an unprecedently high level; the greatest productive plant of all time; national income hardly dreamed of in pre-war years; a large volume of accumulated savings, and an unmeasured demand for goods denied to the consumer by war's exactions.

How to manage these potentialities that they may be translated into actualities is a job for private enterprise aided by the federal government, the bureau says.

The study of postwar markets was made under the direction of S. Morris Livingston, chief of the bureau's national economics unit, at the suggestion of the Committee for Economic Development. It is designed to assist marketing analysts in setting their sights on a goal of greater postwar opportunities.

Accepting the proposition that a high level of employment of highly productive employment must be maintained after the war, the study seeks to answer these questions:

1. What would total business volume be if most of the people who will want to work after the war do have productive jobs?

2. How does the war affect the possibility of reaching that goal? What will be the magnitude of the accumulated demand for goods? How big a backlog of purchasing power in the form of extra savings? What obstacles must be overcome?

3. What opportunities would such a national market offer the individual business? How can this market potential be measured?

Distributing Output Is Problem

Productive capacity of the country has been demonstrated during the present war effort and the technological developments which have emerged indicate further increases in efficiency. The problem that remains is that of distributing an output of civilian goods equal to present wartime production.

There is much that the federal government can do to facilitate planning postwar distribution, the study finds, by creating more favorable environment for the production of more goods for more people at less cost.

In large part, however, it is pointed out, the planning requires the aggregate effort of thousands of businessmen each of whom has a detailed knowledge of the problems and possibilities of a particular enterprise.

"This does not mean that you should depart from the profit motive in order to assume a social obligation to put people to work," the study emphasizes. "Business is not an entity. It is an aggregate of individual firms no one of which can afford to get very far away from its own competitive problems.

"The production and sale of a large volume of goods can only be accomplished if the purchasing power exists. Business as a whole can create this purchasing power by putting more people to work producing goods. The individual enterprise, however, can follow this policy only so long as it shows a profit.

"This profit and the resulting financial strength of the enterprise are essential if we are to achieve a high level of production employment. Since the good of the country as a whole and the financial success of the individual enterprise both point in the same direction, there is a double incentive for making the most of the opportunities for making more profits by putting more people to work."

The study points out that this country produced more goods and services in 1940 than in any previous year. Yet of total available manpower—those able and willing to work—only 46,000,000 were employed and 9,000,000 were unemployed.

Fewer people, working shorter hours, produced substantially more goods and services in 1940 than in 1929. This was possible because of continued improvement in efficiency through the greater use of labor-saving devices and techniques. The large increase in available manpower resulting from population growth remained unemployed. Volume of business had not expanded in line with capacity to produce and desire to consume.

Ultimate limit of productive capacity, the study finds, is determined by the number of persons willing to work and the potential output per person. There may be other more immediate limits. Even with an unlimited market the out-

SYNTHETIC RUBBER TAKING CARLOADS OF EQUIPMENT

LINE production methods are being employed at one of Blaw-Knox Co.'s plants in producing, ahead of schedule, 3500-gallon pressure mixers and other equipment used in manufacturing synthetic rubber. The company estimates 600 carloads of this and other types of equipment for synthetic rubber will be required for the United States Rubber Co. plant at Institute, W. Va., first unit of which is now operating. More than 200 carloads were installed by Blaw-Knox in Firestone's synthetic rubber plant recently put in operation at Baton Rouge, La.

put may be restricted by lack of physical plant to employ all of these people at civilian production, or because the people who want jobs may be in the wrong places.

Productive capacity is continually growing. Between 1940 and 1946, another 2,500,000 persons will have been added to the civilian labor force. This will result from an increase in population of working ages with an allowance for other influences, notably the trend toward longer schooling and earlier retirement. It assumes most of the women and other war workers who were not employed before the war will not seek employment after the war, and that there will be almost 2,000,000 in the armed forces as against less than 500,000 before the war.

Assuming 2,000,000 unemployed to be a practical minimum, the bureau estimates the potential increase in civilian employment between 1940 and 1946 as almost 10,000,000 jobs.

Of equal importance in measuring the capacity of the available manpower is a continuation of the past trend toward increased output per worker. This results partly from technological developments and partly from the shift out of less productive to more productive jobs.

Over the 12 years, 1929 to 1941, the country's output per man-hour of employment increased 34 per cent. This was at a rate of 2½ per cent per year compounded. There was about the same rate of gain during the preceding 30 years and it appears likely the rate will be accelerated rather than retarded by the war.

Output at 170 Billion Rate

By combining the increase in the labor force with the increase in output per man-hour, and assuming that people will want to work the same hours as in 1940, the potential capacity of the available manpower in 1946 is almost 50 per cent greater than total output in 1940. In 1940 prices, the gross national product total cost of goods and services to the ultimate consumer, including producers' capital goods and government services, would be around $142,000,000,000 as compared with $97,000,000,000 in 1940. In 1942 prices, it would be around $165,000,000,000.

This capacity is being proved during the war. The study finds the employment of women and the longer hours worked just about offsets to diversion of manpower to the armed services. During the first quarter of 1943, the gross national product was at an annual rate of $170,000,000,000, or $146,000,000,000 in 1940 prices. Physical output of goods and services already is 50 per cent greater than in 1940 and before the end of the war will be well over 50 per cent.

The estimate of 1946 gross national product is advanced as a measure of the capacity of available manpower after the war. It is not a forecast of the postwar volume of business. The optimum employment of 96 per cent of available manpower, leaving only 2,000,000 out of work while changing jobs or for seasonal reasons, will be difficult to maintain. It was reached in 1929 and is being exceeded during the war, but average performance over the last two decades has been well below this rate.

"It seems almost certain that post-war output must exceed the best pre-war year," the booklet states. "If it should be no more than in 1940 there would be the 9,000,000 who were unemployed in 1940 plus the 2,500,000 added to the civilian labor force between 1940 and 1946, plus 8,000,000 who would be displaced by improvements in efficiency over the six years—a total of 19,000,000 unemployed. Even with an average work week five hours shorter than in 1940 there would be more unemployed than the 13,000,000 in 1932.

"Remember this country is still experiencing a strong growth trend. Beyond 1946 the continued growth of available manpower and its productivity can be expected to add to this capacity at the rate of perhaps 3 per cent or $5,000,000,000 per year."

The study raises a pertinent question: Can business succeed in creating an effective demand for a high level of production? Failure to accomplish this in years past was not due to a lack of human wants. The problem largely was one of distribution.

Impact of the war will be a strong factor creating a large postwar demand for goods and services. Demand for many goods is being deferred as materials and manpower are diverted into the war effort, and at the same time savings are accumulating. *Markets After the War* presents a national income statement to demonstrate that purchasing power already exists to buy much more than was produced in 1940.

Against this optimistic picture of the postwar potential, the study presents a pointed discussion of serious problems which must be solved if the goal is to be reached. Unless business enterprise can overcome the economic maladjustments left by the war, certain industries and communities may have a large volume of unemployment at the same time that other industries and communities have a

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CHRYSLER OFFICIALS PARTICIPATE IN ARMY MANEUVERS

K. T. KELLER, left, president of Chrysler Corp., and E. J. Hunt, right, operating manager of the Chrysler tank arsenal, worked with Maj. Gen. W. H. H. Morris Jr., center, commanding officer of the Sixth Armored Division of the Army, at Desert Center, Calif., during recent fighting maneuvers. For three and a half days and nights the Chrysler officials lived the lives of soldiers in combat conditions, observed Chrysler-made materiel in action

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide, published in Section II of STEEL, Dec. 14, 1942

CMP REGULATIONS

No. 1 (Direction 5): Heat-treated and Normalized Carbon and Alloy Steel, issued April 19. Prohibits producers from shipping normalized or heat-treated carbon or alloy steels on any commercial warehouse order. Shipments can be made on validated orders, if the steel already has been normalized or heat-treated, or is now in process of being so treated. Exempts shipments to warehouse stocks which are "earmarked" for aircraft use or for direct shipment to a manufacturer of aircraft parts. Directs that commercial warehouse orders which already have been melted but which have not been placed in process of normalization or heat-treatment should be renegotiated with purchasers on basis of furnishing plain hot-rolled, annealed, or cold-drawn steel. Commercial warehouse orders which have not as yet been melted should be either cancelled or renegotiated with a view to substituting these types.

No. 2 (Inventory Direction 6): Segregated Structural Steel for Construction, issued April 24. Exempts builders of bridges, buildings and similar works who normally receive materials "tailormade" for specific projects from the provision requiring combined inventory records to include such materials. Requires builders to keep such items segregated for each project but prohibits acceptance of delivery more than 60 days before it is scheduled to be used.

No. 5 (Interpretations 2 and 3). No. 2, issued April 20, forbids persons operating under terms of the regulation to use the MRO symbol for the purpose of making allotments of controlled materials to others. No. 3, issued April 22, points out that reels required for shipment or delivery of products may be obtained under terms of Regulation No. 5.

E ORDERS

E-11: Foundry Equipment and Electrical Metal Melting Furnaces, effective April 23. Prohibits sales, transfers or deliveries of specified types of equipment after June 1 except on orders bearing rating of AA-4 or higher. Prohibits purchase by the application of any preference rating on forms PD-25A, PD-25F or CMP Regulation 5 or 5A. Exempts repair and maintenance of such equipment.

L ORDERS

L-13-a (Amendment): Metal Office Furniture and Equipment, effective April 24. Permits production and delivery of equipment for shipboard use on orders from the armed services, Maritime Commission, and War Shipping Administration without specific authorization from WPB. Places all items on one list, including insulated metal filing cabinets, safes, metal visible record equipment, metal shelving, metal lockers, metal desks, etc.

L-238: Sun Glasses, effective April 23. Permits use of metal in manufacture of sun glasses or cases for sun glasses only to extent designated in schedule A of the order. Exempts aviation sun glasses manufactured for the Army, Navy, and Lend-Lease purposes, if specifications for such glasses cannot be fulfilled within these limitations. Exemption does not apply to aviation sun glasses purchased by Army or Marine Corps Post Exchanges or by Navy Ship's Service Departments. Permits use of steel for: spring clips in slip-over types of sun glasses, half-hinges, hinge pins and rivets, snaps for cases, and core wire in plastic temples, if manufactured from wire in the producer's inventory on April 23 or from wire obtained by him through a special sale as defined in Priorities Regulation No. 13. Permits use of brass for: barrel-hinges, hinge pins, rivets and screws to fill orders with preference ratings of AA-5 or higher. Permits use of copper (strike), zinc, silver, gold and paladium for electroplating. Finished parts may be assembled into products that can be completed on or before May 23.

L-252 (Amendment): Valve and Valve Parts, effective April 24. Eliminates certain specifications of physical properties of some of the steels contained in the original order, reducing the types of gate, globe, angle cross and check valves. Changes cover specifications of bodies and bonnets, bonnet bolting and bonnet bolt nuts of steel valves.

M ORDERS

M-9-c (Amendment): Copper, effective April 22. Restricts use of copper in rubber hospital sundries. Permits use on orders rated AA-4 or higher, if the copper material was acquired before June 30, 1942, and allows a manufacturer to apply to WPB on PD-426 for authorization to fill lower-rated orders. Permits use without preference rating, if the copper material was acquired after June 30, subject to the following conditions: the copper material may not be used where the use of a less scarce material is practicable; use is also prohibited of more copper material than is necessary for the proper operation of the article to be manufactured.

M-115 (Amendment): Collapsible Tubes, effective April 23. Permits manufacturers to pack toothpaste in tin-bearing tubes for the American Red Cross free of the quota restrictions on the use of collapsible tubes. Permits American Red Cross to make free distribution of tubes of toothpaste or shaving cream without obtaining used tubes in exchange. Under the order, manufacturers may not pack in tin-bearing tubes, with certain exceptions, more than 75% of the amount of dental cleansing preparations they packed in 1942.

M-148 (Amendment): Exports under Licenses Issued by BEW, effective April 19. Eliminates necessity of filing copies of export purchase orders with WPB.

Amendment, issued April 23, revokes Supplement No. 1 which had provided for the establishment of export quotas for producers of various steel products. Load directives, issued under CMP to BEW, now accomplish the same results.

PRIORITIES REGULATIONS

No. 16 (Amendment): Appeals, effective May 1. Removes following six orders from the list of those which may be appealed only though WPB field offices: L-22, L-23, L-23-a, L-23-b, L-59, and L-59-a; adds following six order to the list: L-13-a, L-22-a, L-23-c, L-182, L-238 and L-277.

PRICE REGULATIONS

General Maximum Price Regulation (Order No. 44), effective April 26. Provides method by which producers may establish maximum prices for articles made of black plate instead of tin plate as formerly without applying to Washington for authorization. The order is applicable generally to items not covered by Price Regulation No. 350 and requires producers only to file a statement about the price with the OPA. The method is to deduct the delivered cost of tin plate per unit, when tin plate was last used, from the ceiling price of the article made of tin plate, and to add to the result the delivered cost of black plate per unit, including enamel if any is used. The sum is the ceiling price of the black plate article.

Shipments of Heat-Treated Steels to Warehouses Banned

Steel producers have been prohibited, until further notice, from shipping normalized or heat-treated carbon or alloy steels on any commercial warehouse order, by CMP division of WPB.

However, if steel to fill such orders has already been normalized or heat-treated, or is now in process of being, it may be shipped, if the orders are otherwise validated in accordance with WPB regulations.

Warehouses have placed orders for these particular types of steels to an extent which endangered deliveries for more important purposes. It has been reported that in some instances 25 per cent of the orders for these types now on mill books are from warehouses.

To take care of this condition, Direction 5 under CMP Regulation No. 1 has been issued to prevent deliveries to warehouses until further notice. The prohibition does not apply to shipments to warehouse stocks earmarked for aircraft use or for direct shipment to a manufacturer of aircraft or aircraft parts. It does, however, cover all other orders for warehouse stocks and deliveries to warehouse customers.

Commercial warehouse orders which have already been melted but which have not been placed in process of normalization or heat-treatment should be renegotiated with purchasers on the basis of furnishing plain hot-rolled, annealed or cold-drawn steel, according to the direction. Commercial warehouse orders which have not as yet been melted be either cancelled or renegotiated with a view to substituting these types.

Salvage Manual for Industry To Be Distributed Soon

After months of study, and with the aid of some two dozen competent men, the WPB Salvage Division has completed a *Salvage Manual for Industry*. It now is at the government printing office and it is expected to be available for distribution around May 20. Of 25,000 copies to be printed, 20,000 will go to major scrap producing and collecting organizations while the remaining 5000 will be available for sale.

Manual is not intended only for use during the war. It was written as a contribution to the cause of salvage, a subject that will be regarded after the war as being far more important than it was considered before the war.

Maritime Commission Contracts For 460 More Merchant Vessels

ADDITIONAL contracts for the construction of 460 merchant ships, including 222 new design Victory ships, were awarded last week by the United States Maritime Commission. Contracts for 469 merchant vessels were announced the preceding week (STEEL, April 26, p. 55). The awards bring the total number of Victory ships contracted for to 411.

In addition to the 206 high-speed tankers previously announced, the commission awarded contracts for the construction of 28 more. The remainder of the contracts call for the construction of 210 Liberty ships.

Complete list of yards and ships to be constructed under the new contracts follows:

Bethlehem-Fairfield Shipyard, Baltimore, 15 Liberty and 112 Victory.

Permanente Metals Corp., No. 2 plant, Richmond, Calif., 6 Liberty and 75 Victory.

J. A. Jones Construction Co., Panama City, Fla., 57 Liberty.

J. A. Jones Construction Co., Brunswick, Ga., 55 Liberty.

Permanente Metals Corp., No. 1 plant, Richmond, Calif., 25 Liberty and 35 Victory.

Alabama Dry Dock & Shipbuilding Co., Mobile, Ala., 28 tankers.

St. John River Shipbuilding Co., Jacksonville, Fla., 52 Liberty.

Machinery To Take Bulk of U. S. Plant Expenditures

About 60 per cent of the cost of government-financed industrial plant expansion this year will be used for machinery and equipment as compared with 45 per cent last year, according to WPB. Remainder of expenditures is for construction.

In 1943 the distribution of an estimated $4,500,000,000 plant expansion program is expected to be $2,700,000,000 for machinery and equipment and $1,800,000,000 for construction.

New War Plant Facilities Authorized by Government

New war plant facilities authorized by the Defense Plant Corp., to be owned by DPC and operated by the contractors, include the following (figures approximate):

Ahlberg Bearing Co., Chicago, to provide plant facilities in Illinois at a cost of $1,000,000.

Timken Roller Bearing Co., Dayton, O., to provide plant facilities in Ohio at a cost of $1,750,000.

Babcock & Wilcox Tube Co., Beaver Falls, Pa., to provide equipment for a plant in Pennsylvania at a cost of $425,000.

National Lead Co., New York, to provide plant facilities in New York at a cost of $1,500,000.

Trayer Products Inc., Elmira, N. Y., to provide additional equipment for a plant in New York at a cost of $100,000, resulting in an overall commitment of $130,000.

Koppers Co., Baltimore, to provide additional equipment for a plant in Maryland at a cost of approximately $25,000, resulting in an overall commitment of $4,900,000.

General Electric Co., Schenectady, N. Y., to provide additional plant facilities for a plant in Ohio at a cost of $22,000, resulting in an overall commitment of $120,000.

General Motors Corp., Detroit, to provide additional equipment for a plant in New Jersey at a cost of $800,000, resulting in an overall commitment of $3,750,000.

GUN MOTOR CARRIAGE IS ARMY'S LATEST

ARMY'S M-12, a 155-millimeter gun mounted on a M-3 tank chassis, is an all-purpose weapon, throwing a 95-pound projectile more than ten miles and capable of knocking out any tank or even a heavy cruiser at that range. It is highly mobile, attains the speed of a medium tank, and can be shifted quickly from one task to another. NEA photo

20-Inch Pipeline To Be Extended to East Coast

Defense Plant Corp., on recommendation by the Petroleum Administration for War, has agreed to finance extension of a 20-inch petroleum products pipeline to the harbor area of New York.

New section, to be constructed by War Emergency Pipelines Inc., will complete the link from Seymour, Ind., to the East coast and will provide for a capacity movement of approximately 235,000 barrels of petroleum products per day from the Beaumont-Houston area of Texas.

First sections of the line—a 16-inch tube from Baytown and Port Arthur to Beaumont, Texas, and a 20-inch line from there to Norris City, Ill., and Seymour, Ind., were approved by Defense Plant Corp. about two months ago.

Completion of the Seymour-New York area section, also a 20-inch line, will bring the overall cost of the entire project to $75,000,000.

It is contemplated that the first section of the line will begin delivery of petroleum products to Seymour in October, 1943. Work on the Eastern section of the 20-inch line is expected to be completed by the end of this year.

War Knits Closer Economic Ties for American Republics

By JOSEPH C. ROVENSKY
Assistant Coordinator, Office of Inter-American Affairs

EVERY cloud has a silver lining, even war clouds, and one of the bright sides to the present conflict, which has so completely disrupted the economy of our world, is the discovery that the most distant markets are not always the greenest; that there are excellent opportunities to buy and sell right here among the neighbors at home.

This realization, that we of the Western Hemisphere can supply a great many of our common needs, has brought about the most rapid growth of commerce-between-neighbors that the Americas have known.

Furthermore, the trend toward unity, co-operation and better understanding, which goes hand in hand with trade commerce, has every indication of being permanent and of providing a firm basis for future hemisphere solidarity.

Each day new commodities and new products, originating in our own part of the world are replacing those we used to buy from overseas.

While the United States has signed many trade agreements with the other American republics, and opened new markets close at hand, it is by no means alone in this field. All 21 republics of the New World are now entering into formal and informal agreements with each other, exchanging goods and goodwill, lowering trade barriers and speeding the interchange of commerce to a degree never known before.

One of the most significant of these understandings is the accord, signed Dec. 23, between Mexico and the United States.

In this trade agreement with Mexico, the United States quotas on petroleum products have been lifted and lower tariffs have been granted on live cattle, minerals (especially lead and zinc), and on various other products which we import. Mexico, on her part, has reduced the tariff on a long list of the products of United States agriculture and industry.

Trade Pacts Increase

The United States now has reciprocal trade agreements with 15 of the other American Republics. This system of trade pacts also has spread rapidly among the American republics.

Reciprocal trade agreements have been signed between Chile and Uruguay, Venezuela and Chile, Argentina and Cuba, Brazil and Argentina, Argentina and Colombia, Argentina and Chile, Venezuela and Argentina and Brazil and Chile. Most of these pacts provide for unconditional most-favored-nation treatment.

Local measures have supplemented the over-all agreements. Panama, for example, has reduced all import duties on foodstuffs. Bolivia removed a duty on flour. Mexican exports to Costa Rica have increased greatly because of the elimination of 100 per cent custom surcharges.

El Salvador has recently entered into a complete free trade arrangement with Guatemala, the first full free trade agreement in the Americas, followed by a similar agreement with Honduras.

The results were so satisfactory that business interests of El Salvador are now urging that similar arrangements be extended to Nicaragua and to Costa Rica.

In connection with these two trade agreements of El Salvador with its neighbors, a newspaper in that republic stated: "Nothing in the history of these three republics—El Salvador, Guatemala and Honduras—has caused closer relations of better understanding than these free trade treaties."

Under this arrangement Honduras already has sent El Salvador commodities to the value of a quarter of a million lempires (approximately $125,000).

Guatemala's trade with Mexico, which in the past was small, has soared within the past year to over a million dollars.

Nicaragua, Guatemala and the other neighboring republics now look to Mexico for a large variety of goods, such as glass-ware, cotton goods and mining machinery.

A group of Nicaraguan business men who recently visited Mexico City have expressed great surprise at the wide range of manufactured goods available there and at the range of prices which were, in some cases, well below the cost of similar merchandise imported from Europe.

Uruguay is now arranging with Brazil for the construction of a new international bridge to cross the River Chuy and to unite the two republics where their boundaries meet on the Atlantic coast. This will open a new avenue of communication for commerce and for tourists both of which are so important to the economy of Uruguay.

Argentina Accepts Bolivia's Oil

Bolivia is delivering crude oil to Argentina by pipeline at the rate of 3000 tons—roughly 19,000 barrels a day. Argentina credits oil deliveries against advances which have been made to Bolivia for the construction of the Bolivian railroad from Yucuiba, which is on the Argentina border, to Sucre, Bolivia. According to the agreement between the two nations, Bolivia may pay for this in either cash or oil and Argentina much prefers to have the oil, which she needs for her expanding industries.

Argentina's exports to Bolivia, Chile, Uruguay, Brazil, Panama, Peru, and Colombia show an increase of 23 per cent

Modern architecture along the Esplanada de Castello in Rio de Janeiro, Brazil, is revealed in this illustration. Brazil with its large cities and large population is expected to play a very important role in Inter-American trade relations after the war. NEA photo

and imports from these countries are up 41 per cent. Brazil's exports are up 15 per cent.

Cuba's exports to Mexico, Panama and Argentina are up 285 per cent, and imports from them are up 172 per cent.

Trade between Bolivia and Argentina, in the first nine months of 1942 reached 30,000,000 Argentine pesos. Bolivia has an arrangement with Argentina to ship that country 250 tons of crude rubber a year for five years. In the first six months of 1942 Bolivia sent 702 tons of rubber to Argentina, 100 tons to Chile and 1022 tons to the United States.

Argentina has set aside 10,000,000 pesos for the construction of the Bolivia highway from Tarija, Bolivia, to Balcarce on the frontier. The new Bolivian-Argentine Chamber of Commerce opened at 580 Avenida de Mayo, Buenos Aires.

The signing of the commercial treaty between Bolivia and Argentina and the opening of an Argentine Sample Display in La Paz in December, 1942 marked the beginning of a new period of closer commercial relations between Bolivia and Argentina.

"The sample display is not only tangible proof of the industrial capacity of Argentina but also forms a new link in the growing friendly relations between the two nations", said a La Paz newspaper.

The sample fair is one of several activities of the Inter-American Economic Institute of Buenos Aires which is working to improve the trade relations with the Western Hemisphere. Branches of this organization have been organized in Chile, Brazil, and Uruguay.

Mexico Makes Trade Gesture

One of the most pretentious of the Inter-American trade gestures is the Mexican Commercial and Cultural Exhibit which is to tour the republics of Central America.

"No event in recent times has created such widespread interest or has been received with such unanimous approval as the announcement of the impending visit of a traveling Commercial and Cultural Exhibit from Mexico to the capitals of Central America", said a weekly of Mexico City. Manuel Avila Camacho, President of Mexico, has given the enterprise official endorsement.

The interchange will not be one-sided, as the traveling exposition will be accompanied by representative Mexican business men and trade envoys who will seek out products of the Central American republics, both manufactured goods and raw materials, which can be profitably absorbed by the growing markets of Mexico.

The exposition will consist of textiles of all kinds—cotton, silk, and woolens, knitted goods and stockings, shoes and leather goods, glassware and china, petroleum products, medicines and the many pharmaceutical products now produced in Mexico.

The cultural side of the exhibition will be covered by a fine exhibit of modern books and literary works published in Mexico and with a display of modern art—oils, pastels and water colors. The exposition is "hailed as a diplomatic triumph for Mexico."

This traveling fair follows the opening of the new Suchiate River railbridge which, for the first time, makes possible direct overland rail shipments between Mexico and several of the Central American republics. Already, improved economic relations between Mexico and the countries of Central America is boosting Mexican exports to these nations from 20 to 30 times former levels.

Peru, which has a surplus of petroleum, is now shipping oil and petroleum products to Chile, Argentina, Uruguay and Bolivia.

Bolivia Large Importer

Bolivia is importing rice from Paraguay and Ecuador and live cattle from both Peru and Argentina. Argentina now ships 34 carloads of live cattle a week into Bolivia, half of which are for local consumption and half transshipped to Antofagasta, Chile. Argentina has agreed to provide Bolivia with steel rails for the new Sucre-Camira railway and has made important reductions on the freight rate on flour bound for Bolivia.

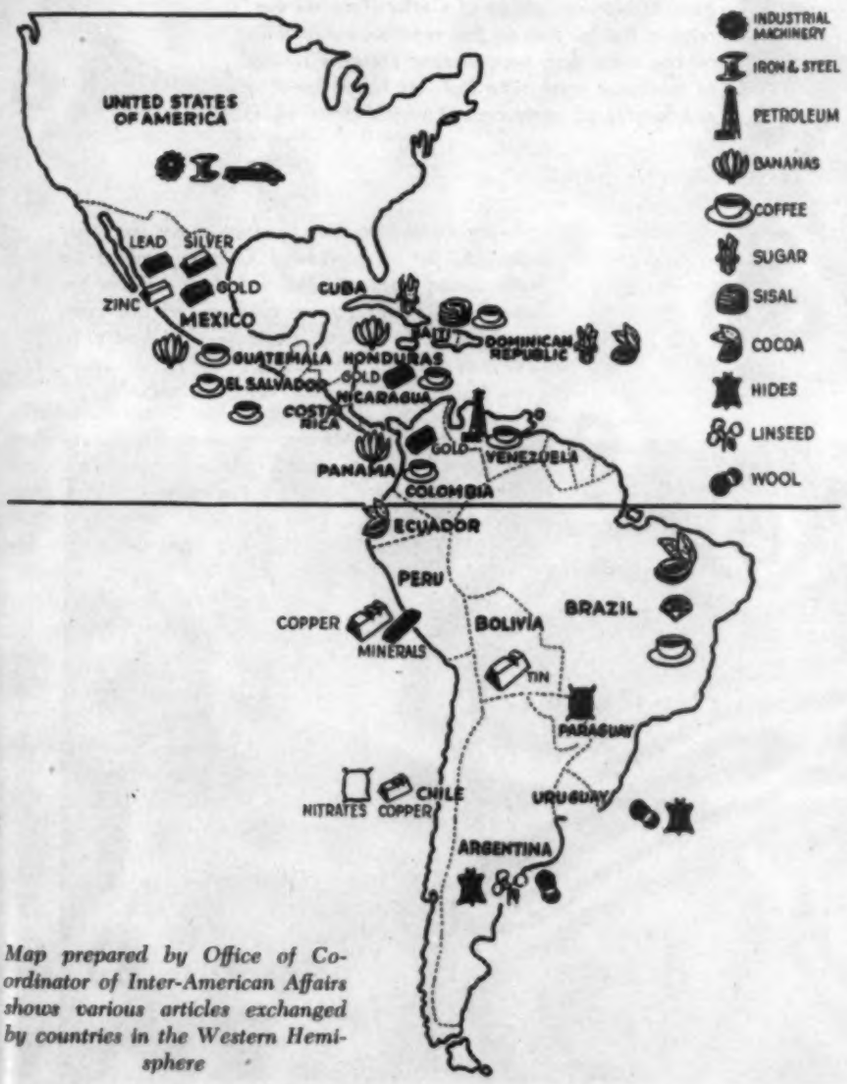
Uruguay is selling "tasajo" or dried beef to Puerto Rico. A shipment of 230 tons was dispatched early in January at an advantageous price, approximately 500 Uruguayan pesos per ton. Uruguay is seeking markets for its tasajo in Peru, Bolivia, and Chile.

Brazil sales to Colombia of pharmaceutical and other products have more than doubled in two years, with a total in excess of $180,000 in the past year.

Costa Rica is exporting agricultural chemicals to its neighbors and is buying matches from Honduras.

Ecuador buys from Argentina chem-

(*Please turn to Page* 146)



Map prepared by Office of Co-ordinator of Inter-American Affairs shows various articles exchanged by countries in the Western Hemisphere

Pierre McBride, president, Porcelain Metals Corp., Louisville, Ky., holds "E" pennant. Looking on are Edgar Whitfield, employe representative; Gov. Keen Johnson, Kentucky; and Lieut. Col. W. R. Martin

Five Milwaukee plants of Cutler-Hammer Inc. receive the burgees in five separate ceremonies on the same day, necessitating accurate timing to minimize work time lost. At left is view of ceremonies at company's Twelfth street plant

Kelley-Koett Mfg. Co., Covington, Ky., received the "E" for production of X-ray equipment for the armed services. Shown below, holding the pennant: Fred Litmer, employe of the company for 29 years; Lieut. Col. Charles G. Gruber, Army; Commander G. H. Bowman, Navy; A. H. Feibel, company president

Charcoal Iron Shortage Causes Concern; Hardwood Supply Scarce

PRONOUNCED shortage in charcoal pig iron is causing considerable concern among consumers and indications are that the situation will become worse before it gets better. Some trade interests believe the Wells furnace, in the upper Michigan peninsula, which has been down for two months because of shortage of charcoal, will be down indefinitely. At the time it stopped production it had been drawing on hardwood from more than 100 miles away, and the supply was getting constantly leaner.

The Newbarry furnace, also in upper Michigan, had less than a week's supply at the time it suspended operations recently. This furnace is now being relined, but indications are that it will not resume operations nearly as soon as indicated, because of lack of charcoal.

In the lower peninsula of Michigan, at Mancelno, a small but very efficient charcoal iron furnace continues in operation, although it recently cut its production from 2000 to 1500 tons a month. Tennessee Products Co. has a stack near Nashville, Tenn., which is understood to be operating at present on part charcoal and part coke. These are the only two furnaces now making charcoal iron in the country, so far as can be learned, and their output is far short of requirements.

In the Lake Superior region pig iron production was around 50 per cent in March and indications are it will run around 21 per cent in April, with the Mancelno furnace the only producer.

While some special analyses irons are used to fill the gap in some places, and for certain purposes may be used indefinitely, it is generally admitted that such irons as have been developed so far cannot serve effectively as a substitute for charcoal iron in many cases.

Charcoal iron has long been favored by rollmakers and by machine tool builders, in a certain amount. Manufacturers of chemical equipment require charcoal iron for making pots for melting of caustic soda and certain other chemicals. Various foundries throughout the country, in fact, have been using from 25 to 50 per cent charcoal iron, apparently finding it profitable, despite the higher cost compared with ordinary grades of foundry iron.

The present shortage is said to be due in important measure to lack of reforesting. Particularly is this true in the upper Michigan peninsula, it is said. And to bring in a new crop of hardwood requires 15 years. In northern Pennsylvania, around Coudersport, almost due south of Elmira, N. Y., over the state border, reforestation of hardwood has received much attention since the turn of the century. The Gray Chemical Co., which has a large charcoal producing plant in that area, is now harvesting its third crop since the late 90's. A considerable supply of hardwood is to be found in eastern Texas, but no facilities for producing charcoal have been installed.

While this shortage in charcoal has been watched with growing apprehension by some familiar with the situation, Washington, it is said, has been loath to approve construction of such equipment as needed, because of the pressure of other war demands. But even now Washington is becoming concerned.

Recently H. M. Harker, Chemical Division, War Production Board, issued a letter urging charcoal producers to get out more wood for making charcoal.

At present demand for charcoal is said to be around 1000 tons per day, far in excess of capacity. It is understood that as high as $32 a ton has been offered for charcoal in some emergency cases, without a taker. Such a price compares with $28, Lake Superior furnace, the ceiling price on charcoal pig iron in that region. This gives an idea of just how serious the charcoal situation is, it is pointed out.

Germany To Lose, Britain To Gain Phosphate Source in North Africa

GREATEST mineral loss to the Axis powers, in the event of their early withdrawal from North Africa, will be phosphate rock, in the opinion of some leading ore men in this country. With the fall of Sfax, the major port of export for phosphate in North Africa has been closed to them. In that vicinity, it is pointed out, lie substantial reserves of especially high grade phosphate, running around 58 per cent, needed by Germany for agricultural purposes.

Germany has certain other sources. She is able to bring phosphate rock in from France, and it is considered probable that she is importing it from Spain. What Germany has been able to obtain from Russia is a question, but it is known that perhaps Russia's best source for this material is in the far north, out of reach of the Axis. However, Germany will miss the North African supply badly, it is declared, not only because of the needs of her agricultural industry, but also for its value in production of ferrophosphorus and certain chemicals.

It is believed likely that once full control of North Africa is obtained by the Allies that England will draw heavily on this supply of phosphate. Heretofore, since the beginning of the war, England has been an increasing buyer of phosphate from the United States. However, this has meant the use of much valuable cargo space needed for other materials.

In drawing upon North Africa for phosphate rock, the exact reverse situation is true with respect to shipping. England for some time, it is believed, will have ships moving into the Mediterranean area with heavy cargoes and will have plenty of space available for phosphate and other freight for the return trip. As this supply increases her requirements from this country will taper. It is understood that England and the United States have already come to an agreement with respect to this shift.

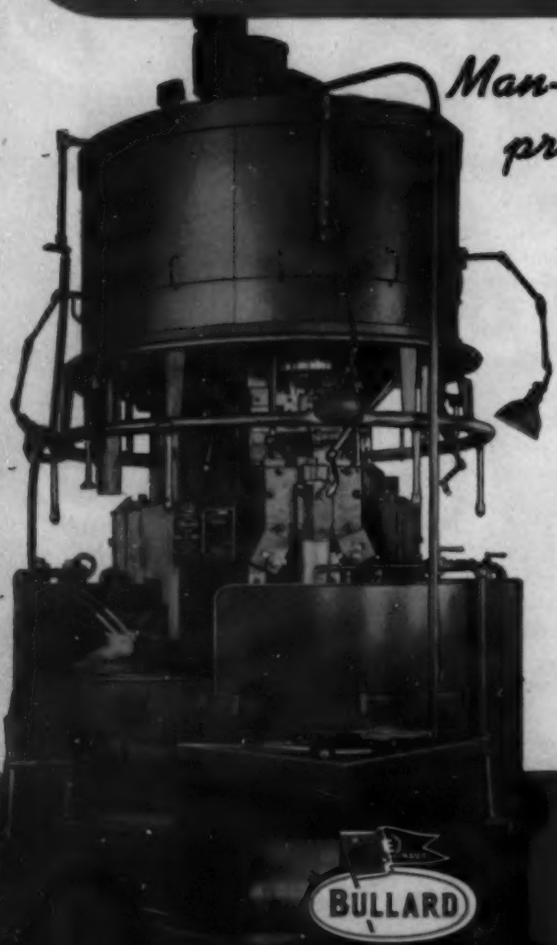
England, in an agreement with this country a few months ago, will also obtain iron ore from North Africa, with the United States to get certain other minerals, such as cobalt and manganese. England is already drawing the iron ore.

Germany, of course, will feel the loss of this iron ore, although some leading ore men here believe that Germany's position will continue fairly good, particularly because of her Swedish connections, which furnish her major supply. She is also able to obtain substantial quantities from France and it is believed a certain amount from Spain, although England is said to be obtaining once more an increasing proportion from that country.

There are many fine iron ores in North Africa, including the low phos Djerissa-Slata ore from Tunisia, the low phos Tinezrit and Ouenza ores and manganiferous Sebana ore from Algeria; the bessemer Rif and Navarette ores from Spanish Morocco and other brands.

England since the outbreak of the war has been hard hit by loss of many of these ores. She has had to develop extensively her own low grade "iron stone" mines and with good success and has been convoying shipments of high grade ore from Sierra Leone, West Africa. However, she welcomes resumption of supplies of these North African ores.

estimate revised...



Man-hours required to produce a big Army Bomber

Estimate (1940) ~~110,000~~

Actual (1943) 23,000

Yes, it's a fact. America is building her bombers in a trifle over one-fifth the time originally anticipated. This is based on a statement made by Robert P. Patterson, Under Secretary of War.

Miracles like this don't just "happen". They come from far-sighted planning. And in the making of airplanes, they come from the most generous sharing of experience and improved methods any industry has ever known.

Bullard is proud that so many V.T.L.s and Mult-Au-Matics are helping in this vital work. More Bullard machines are making airplanes today than are engaged in any other industry. And Bullard wishes to contribute all the "know-how" in their experience to assure that every one of those machines does its utmost to push production schedules still further. Call on the Bullard technical staff wherever there's a chance that we can help.

BULLARD

The Bullard Company

BRIDGEPORT, CONNECTICUT

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Body evolution expected to result in improved vision and ventilation. . . Engineers and designers clash on radical ideas. . . Anticipate postwar rationing of motorcars to forestall another depression

IN PREVIOUS installments of this series, we have sketched the outlook for engines and chassis; turn now to a consideration of bodies which are after all the determining factor in the purchase of a car to a large cross section of the public which does not know the difference between a synchromesh transmission and a hydraulic torque converter —and cares less.

In developing radical new concepts of postwar automobile bodies, industrial designers are having a field day at the moment, and impractical though many of their proposals may be, there is a method in their madness. They reason that if they can instill in the travel-hungry and goods-hungry public a desire to own and drive one of their creations then manufacturers will be virtually "pressured" into building such dream cars.

On the other hand, the hard-bitten engineers of the motor car companies are resentful of much of this radical design activity and on occasion clash with designers in no uncertain fashion. The engineers realize that they are going to have to build the car once it is designed, that they are going to have to stay within some fairly well defined limits of cost and material. Small wonder that they throw up their hands in holy horror at some of the motor car designs coming off the boards of popular stylists who after all are not too concerned with how something is built but more importantly with what it looks like when it is built.

There is something to be said for both groups. If the knowledge of materials and manufacturing methods possessed by the engineers could be imparted to the dreamy designers and if the imagination of the designers could be transplanted to the engineers who too often are confined to the limits of sliderule and tables of physical properties, the real millennium would be near at hand. As a matter of fact, the analysis herewith has been drawn up for the partial purpose at least of stimulating such a rapprochement of minds between engineers and their suppliers on the one hand and the stylists and designers on the other.

This future airplane design by George W. Walker, Detroit designer, is an amplification of the "flying wing" which Northrop is already testing

Some years ago, Fisher Body brought out a new type of windshield and instrument panel construction which was labeled the Fisher V-V construction—signifying vision and ventilation. It was an important step forward in design and manufacture. Actually the evolution of the motor car body right now is principally along the lines of further improvement in these two qualities—vision and ventilation.

Any tall person who tries to contort himself into one of the late-model streamline bodies without crushing his hat or grooving his head, and then tries to peer out of a rear window pitched at such an angle that the vertical aperture is not over a couple of inches, or tries to peer over a long hood which completely obstructs the forward view below eye level, knows whereof we speak in reference to vision and ventilation—with comfort of access and egress thrown in for good measure. Plain common sense dictates the elimination of these inconveniences.

Object to Transparent Top

But who, by the same token wants to go riding around the town and countryside in a transparent showcase, open to full view above the belt line (of the car, we mean), perched for all the world like a monkey in a glass cage, and a perfect target for snowball heavers or the blistering rays of a summer sun, vitamins notwithstanding? Ask a modern designer about this, and he replies, "Well you can always draw the convenient shade across the inside of the top if you don't like the sun or the showcase effect." This brings up questions about the saneness of building a transparent top—if indeed such a construction ever could be worked out on a practical basis—and then installing a shade to cover it up.

No, the immediate trend of car bodies will not go this far; that is, if a manufacturer wants to sell his car and not just advertise it in the slick magazines. You will see full-finished cold-rolled sheet steel continuing as the standard body and top material for some time to come. But you will see fenders disappear altogether. You will see bodies that you can enter or leave without so much as grazing the ostrich plume on madame's

A SPECIAL REPORT TO INDUSTRY

THE POSTWAR AUTOMOBILE

This is the fourth and concluding article in a series analyzing the postwar automobile, with primary emphasis on passenger cars, from the standpoint of possible changes in materials, subassemblies and manufacturing technique.

Here is another idea for future airplane design. While open to question aerodynamically, it is nevertheless pleasing to the eye

Lily Dache model. You will see curved glass windshields, windows and other elements of new high-strength heat treated glass with nearly the impact strength of steel itself.

You will see movable seats in car interiors, of strange new synthetic fabrics, resilient over new types of springs and foam rubber synthetic pads—cooled from within in the summer and heated in the winter—all on sturdy frames of lacquer-finished aluminum tubing in a variety of pastel shades.

Sees Great Advances

You will see windows which raise and lower at the press of a button. You will see rear-view devices that permit no speed cop to trail you in the "blind quarter." You will see heaters that really heat—perhaps electric elements built right into the body interior instead of a dinky, noisy fan that blows dusty air over a hot hunk of radiator core.

Eventually you will see radios that, in addition to giving access to broadcast programs of commercial transmitters throughout the country and abroad, will permit you to contact your home base and to ask Nora if she has put the roast beef in the oven yet.

You will see the disappearance of instrument panels as we now know them, with any necessary indicators incorporated into the design of the steering wheel which itself may no longer be a wheel but a simple airplane type of segment, controlling the steering power.

It is possible you will see a venture or two into the field of the aluminum panel body, under the strong pressure of the airplane and steadily decreasing cost of aluminum sheet. Certainly, however, it will not be riveted construction, for this is just hopelessly uneconomical for products like automobiles, as well as unsightly when compared with the finish of a modern motor car in sheet steel.

It can be predicted with a fair degree of certainty that the aluminum autobody will not prove successful. In the first place, it will be too flimsy. Sheet steel as now used in the lighter gages, is perishable enough in the press of traffic; aluminum would suffer a still worse pounding. Furthermore the weight saving possible by the substitution would be so small as hardly to merit consideration. And the higher coefficient of expansion of aluminum doubtless would be productive of some pronounced wrinkling under the searing of a summer sun, and perhaps some tearing away from support points in subzero temperatures.

The trend toward streamlining of bodies likely will relax in postwar designs. The savings supposedly effected in streamlining, by virtue of reduced wind resistance, have been vastly overstressed when consideration is given to average driving speeds and also to the fact that much, if not most, driving is done cross wind or at angles to the wind, in which case streamlining is of little value.

Too, car speeds probably are going to be held down to a level of, say, 45-50 miles an hour throughout the country, mainly as a result of the remarkable reductions in accident frequency which resulted from the wartime 35-mile speed limit. It will be difficult to unsell government and state officials on the idea of relaxing much on control of auto speeds. Thus streamlining, of questionable value until higher speed ranges are reached, will have small justification. It will be outweighed by demands of comfort and convenience. Scratch off such things as teardrop designs and rear fins on bodies from future developments.

Because the density of motor cars per square mile of country will continue to increase from present levels, there will be concentrated attention to improvements in safety devices, such as bumpers, turn indicators, fog lights, headlights, horns, etc. Bumpers probably will eventually extend clear around the car of the future. They were headed that way in some 1942 models. It is easily possible to work out a design which would carry the bumper bar fully around the car at its present level, protecting the smooth and lustrous finishes of doors, wheel skirts, hubcaps, rear decks, radiator, grilles, etc.

Avoiding Rash Predictions

In presenting this admittedly incomplete analys's of the automobile of tomorrow as it may be shaped by metals in the world of tomorrow the effort has been made to temper any rash predictions on the basis of what is known today about metals and their usage, with the help of a broad cross section of opinion both within and without the motor car industry.

Some contentions may be repugnant to one section of industry, hailed by another. If this proves to be the case, then the analysis will have been worthwhile, for only by stimulating comment, by enticing both the brickbats and the roses, can a small contribution be made to the advancement of all American industry, and that basically is now recognized as the principal salvation of our way of living.

A word may be in order about the market for automobiles in the postwar period. Study is being given to this question right now in different quarters. Consensus of thought appears to be that the postwar years will find this country with a tremendous backlog of purchas-

(*Please turn to Page* 145)

THE "SKILL" IS BUILT INTO THE MACHINES WITH VICKERS HYDROMOTIVE CONTROLS

SKILLED workers are scarce these days. Many machines must be operated by people who do not have the finished dexterity that comes with long training and experience. Machines must be built to demand less of the operator.

Vickers Hydromotive Controls make it possible to build "skill" into the machine. Any desired control sequence may be set up with a Vickers Hydromotive Circuit. Complex operations may be reduced to a simple routine—or may be made automatic. Controls may be interlocked so it is impossible to do the job wrong. Exact load limitations may be applied so the machine cannot be overloaded.

Such machines are safer—give more and better production, reduce work spoilage—demand much less skill in the operator.

Discuss "hydraulics" for *your* particular machine with a Vickers Application Engineer.

VICKERS *Incorporated* • 1430 OAKMAN BLVD. • DETROIT, MICHIGAN

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Representative of More than 5,000 Standardized Vickers Units for Every Hydraulic Power and Control Function

CONSTANT DELIVERY PUMPS | CONTROL ASSEMBLIES | FLUID MOTORS | VARIABLE DELIVERY PUMPS | DIRECTIONAL CONTROLS | PRESSURE CONTROLS | VOLUME CONTROLS

WING TIPS

Costs, building time for Consolidated planes reduced by suggestions from supervisors and employes. . . Rest periods standard in West Coast aircraft plants. . . Kaiser building 'flying wing"

LOS ANGELES

WHILE production costs in manufacture of warplanes are usually secondary to the actual production of the planes themselves, nevertheless, costs are watched carefully. As C. W. Perelle, vice president of Consolidated Vultee Aircraft, recently told a group of aviation company executives in San Diego, "There is nothing incompatible with the idea of constantly improving quality and at the same time constantly decreasing the cost."

To achieve these ends, Consolidated has inaugurated a Cost Improvement Plan in all eleven divisions of the corporation, aimed at making every individual cost conscious. The plan is divided roughly into three phases—a cost improvement proposal system, an employe suggestion plan and a foreman's cost conversion bonus system.

The first covers the origination of suggestions by those in supervisory capacity, investigation and analysis by a committee and then installation or rejection. In brief, any constructive idea, which will result in a greater reduction in cost than the expense of installation, is accepted.

From August, 1942, to April 3, 1943, 13,000 suggestions were received, out of which 5000 were accepted. Installations as the result of these suggestions now number 5000, with a total indicated saving of 6,058,000 man-hours per year. This plan has played an important part in increasing efficiency of plane production. Mr. Perelle estimates an increase in efficiency of 250 per cent in the past year in building B-24 bombers at San Diego, and increases of 100 per cent in construction of Catalina and Coronado flying boats. Nine times as many man-hours have been saved through the cost improvement proposal plan as have resulted from the employe suggestion plan, although the latter has been given wide exploitation through the use of suggestion boxes in the plants, posters and booklets explaining the plan.

Acknowledge Suggestions

Employe suggestions are made on blanks of standard form. Receipt of suggestions is acknowledged, and then they are classified according to uniform functional headings to provide for a cross-index check for duplication, selective assignment to investigators and to provide date for uniform compilation of reports. Awards for suggestions are made on the basis of ingenuity, originality and completeness, decision resting with a suggestion committee. Since August, 1942, about 9600 suggestions have been received from employes, out of which 1500 were accepted. Now under investigation are 1000 more. Savings per year growing out of employe suggestions amounted to 862,906 man-hours.

Foreman's cost conversion bonus system has been set up for supervisory employes of all manufacturing departments. Budget control standards are in effect in these departments, and each individual department's performance is used in computing the bonus. It is calculated in percentage and this per cent applied to salaries of participating factory managers, superintendents, foremen and assistants.

Bonus Plan Speeds Production

The individual manufacturing departmental bonus formula is based on the departmental operating report which shows the per cent of realization of standard time previously established for the department through time studies; safety, both as to number and severity of accidents; housekeeping, and meeting schedules. Each month's "realization per cent" is used as the "bogey" for the next month.

While part of the bonus is paid for individual performance of a department, an average of performance in all productive departments is also taken to determine the plant's average. This total is applied equally to all sharing departments to encourage interdepartmental co-operation, which is essential since the failure of any one department results in starvation of subassembly and final assembly lines and slowing of production.

Some examples of the bonus plan in reducing man-hours: In fabrication, from Jan. 1 to March 12, the sheet metal department jumped from 61 points of realization to 75 points of realization of standard, an actual increase of 23 per cent in efficiency. From July, 1942, to February, 1943, man-hours required for final assembly of the B-24 bomber were reduced 44 per cent.

Reduction of man-hours has numerous other elements besides the three plans outlined above. One is plant layout, which involves detailed studies of the product, method of manufacture, and the three fundamentals, men, machines and materials.

Material handling efficiency is an important element, likewise. Early studies made by Consolidated showed than on an average 70 per cent of the time of an operator making a part was chalked up to handling, only 30 per cent to actual fabrication. Rapid strides are being made in elimination of unnecessary movement, avoiding backtracking, etc., but of course the goal has not yet been reached and there are still many opportunities for improvement.

Standardization of tool design and processing is a major consideration at the Consolidated tooling department. This has been necessary because of the large numbers of "green" help and also because of the need for complete interchangeability of parts for replacement or spares.

Nearly all the aircraft companies complain of difficulties involved in obtaining a sufficient supply of small tools. West Coast sources are limited and Eastern and Middle Western sources are loaded. Not too much difficulty was experienced in obtaining enough machine tools, but the matter of tooling up these machines was partially overlooked at the time the machines were being ordered. This results in some inefficiency of operation of large multipurpose machines, but steps are being taken to expand the supply of cutting tools to relieve this bottleneck.

Recent innovation in practically all West Coast airplane plants has been the scheduling of 10-minute rest periods twice during each shift. Thus, on the 8 a.m. to 4 p.m. shift, all work will stop for 10 minutes in the morning, say from 9:50 to 10, and again in the afternoon, from 1:50 to 2. Smoking is permitted during these rest periods. Some of the plants play music over their public address systems.

The plan was the outgrowth of studies of fatigue and accident rates. It was demonstrated that by breaking up the shift with these 10-minute rest periods before and after the half an hour lunch period, accidents were fewer and fatigue did not build up so much toward the end of the shift.

Kaiser's "Flying Wing"

Dr. E. O. Koppen, chief aeronautical engineer for the Henry J. Kaiser interests, and on leave from Massachusetts Institute of Technology, said recently in Portland, Oreg., that the first of three giant cargo planes being built by Kaiser under the direction of Howard Hughes at the latter's plant in Culver City, Calif., will be in the air within 12 months.

The plane will be an adaptation of the "flying wing" design, first developed

by John K. Northrop, Northrop Aircraft Inc. The design is claimed to be 40 per cent more efficient than conventional types. According to Dr. Koppen, the Kaiser version of the flying wing will measure 282 feet from wing tip to wing tip; will have gross weight, including cargo, of 175,000 pounds, or 87½ tons; will have four 2000-horsepower engines; will be of riveted construction and built chiefly of magnesium. Flying range without cargo will be 17,000 miles non-stop. Of total weight, 55 per cent will be useful load—fuel and cargo. On a trip of 4000 miles, payload will be 32 tons, or just about the weight of a medium tank.

Northrop, by the way, is reported be doing some interesting things with magnesium sheet for the skin of a new plane under development. This will mark the first time this metal has been put to such use.

Industrial expansion in Los Angeles county during March continued at the high level of earlier months in the year, with total capital investment in new plants and expansions reaching $7,703,716, an increase of 1354 per cent over the $530,000 tabulation for March a year ago. March activity brought total capital invested in industrial expansion for the first quarter to $23,328,266, nearly three times the figure for the first quarter of 1942.

Three new plants were begun in March, while 34 others announced expansions, with indicated additional employment of 4175. For the first three months of the year 18 new plants have been started and 81 plant expansions reported. Growth is coming in a smaller number of plants but with greater capital investment, indicative of heavier basic industries getting underway in southern California.

Metallurgist Says Residual Alloys in Scrap Cause Problem

Speaking before 200 members of the Los Angeles chapter of the American Society for Metals, April 22, Harry W. McQuaid, metallurgist, Republic Steel Corp. and now serving with the iron and steel division of WPB, said one of the principal current problems in production and use of electric furnace alloy steel is in connection with the buildup of residual alloying elements in scrap from which such steel is produced. It is becoming increasingly difficult to produce heats to exact S.A.E. chemical specifications because of residual alloys in scrap and the only way the steel mill can overcome the trouble is to segregate scrap into known types, such as carbon steel alloy-free, nickel-chrome, chrome-moly, etc. However, this is a difficult thing to do in the face of tremendous demands for production.

Better solution is for the large users of such material, such as the aircraft industry, to turn to the NE grades of steel which have analyses carefully chosen on the basis of residual percentages of alloying elements and which in most cases are interchangeable with the higher alloy S.A.E. grades, at least as far as hardenability is concerned.

Mr. McQuaid said he believed that by September the picture on electric furnace alloy steels would be much brighter by virtue of new capacity being brought into production. He said that alloy steel production is now triple or quadruple the best tonnage ever produced in peacetime, while increase in total production is only 10 or 15 per cent. Most critical items on the alloy steel list are electric furnace aircraft quality steels in the form of large-size rounds and billets.

Feature technical presentation at the regular monthly meeting of the chapter was an address on impact and fatigue phenomenon, presented by V. N. Krivobok, chief metallurgist, Lockheed Aircraft Corp., Burbank, Calif.

Suit Against OPA Dismissed For Lack of Jurisdiction

Berg Metals Corp., Los Angeles, in seeking to obtain injunction to restrain the OPA from "destroying its business and good will," was unsuccessful when a federal judge dismissed the suit because of lack of jurisdiction. The concern contended that it was "utterly bewildered" by multitudinous and conflicting orders regarding the handling and sale of scrap metal, and alleged that thousands of tons of iron and tin scrap collected by Arizona school children are still piled up in various small towns because of conflicting orders involving its removal by truck and railroads.

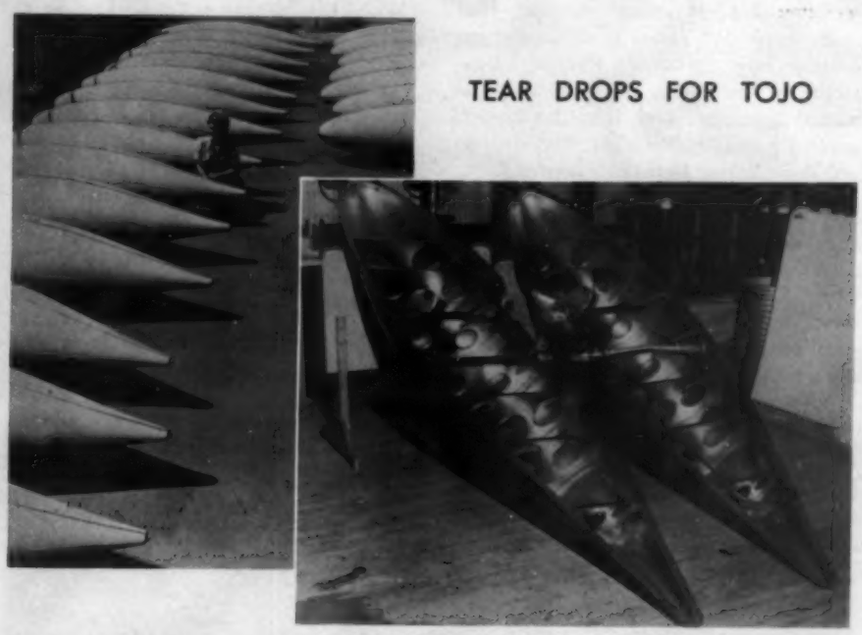
The company charged it was forced to compile 96,000 separate documents last year to conduct its scrap business. The judged ruled the suit should have been brought in Washington.

Aircraft Inventory Items To Be Redistributed by ASU

A move which will speed the production of airplanes by making it possible quickly to transfer materials and parts from the inventory of one manufacturer to another, has been announced by WPB. WPB Directive No. 16 places in the hands of the Aircraft Scheduling Unit at Wright Field, Dayton, O., authority to effect such transfers.

New directive removes from the effect of Priorities Regulations 1 and 13 approximately 400 plants primarily engaged in aircraft production and places them under control of the Aircraft Resources Control Office and the Aircraft Production Board. Through them, the Aircraft Scheduling Unit is given the duty of redistribution of idle and excess inventories of controlled materials.

TEAR DROPS FOR TOJO



DROPPABLE fuel tanks are being turned out by Lockheed Aircraft Corp., Los Angeles, at a rate of one every 4½ minutes. Holding 165 gallons each, two such tanks will approximately double the range of a Lightning P-38 fighter. Weighing 1000 pounds filled, they retard speed only 4 per cent. When empty they may be dropped to lighten load and to minimize danger of explosion if plane is hit by tracer bullets

MEN of INDUSTRY

G. DONALD SPACKMAN

E. ROBERT ISBELL

KAM N. KATHJU

C. C. HERMANN

G. Donald Spackman has been promoted from general manager to vice president in charge of operations, Lukens Steel Co. and it subsidiaries, By-Products Steel Corp., and Lukenweld Inc., Coatesville, Pa. **Everett Chapman,** president of Lukenweld, has resigned to establish a consulting engineering business. Lukens Steel will be one of his clients.

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Robert Isbell, formerly in charge of co-ordinating plant construction and organizational set-ups, has been made division manager, Aviation Corp., Toledo, O., in charge of its subsidiary, American Propeller Corp., and its liquid cooled engine division. Mr. Isbell, also management member, War Manpower Commission, Toledo area, joined Aviation Corp. after five years in charge of production, traffic and export for Packard Motors, preceded by seven years as co-ordinator, export division, General Motors.

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Charles A. Butcher, formerly assistant to national manager, district manufacturing and repair department, Westinghouse Electric & Mfg. Co., has been named manager of that department for the Pacific Coast district, with headquarters in Emeryville, Calif.

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M. W. Heinritz, formerly general manager, storage battery division, Philco Corp., Trenton, N. J., has been named vice president in charge of division.

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Earl S. Patch has been made sales manager, Henry L. Crowley & Co. Inc., West Orange, N. J. Formerly an executive of Moraine Products Division, General Motors, Dayton, O., Patch is considered an authority in powder metallurgy.

W. O. Lippman has been made manager, Westinghouse Ordnance Plant, succeeding **R. V. Gavert** who is being transferred to another Westinghouse plant. Mr. Lippman, for past four years works manager, Westinghouse Electric Appliance Division, East Springfield, Mass., joined the company in 1918.

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Kam N. Kathju, native of India, has been appointed technical director, Arco Co., Cleveland. Mr. Kathju came to Arco, Detroit, as consulting chemist in 1934.

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E. M. Sims, president, Metal Forming Corp., Elkhart, Ind., was elected president, Midwest Manufacturers' Association Inc., at annual meeting, Chicago, April 19. James L. Donnelly, executive vice president, Illinois Manufacturers' Association Inc., Chicago, was named secretary, and John L. Lovett, general manager, Michigan Manufacturers' Association, Detroit, treasurer.

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Albert R. Benson, assistant secretary and assistant treasurer, Stewart-Warner Corp., Chicago, has been elected secretary, replacing Lynn A. Williams Jr., who continues as vice president. Mr. Benson joined the company in 1930.

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James T. Buckley, president, Philco Corp., has been elected chairman of the company's executive committee. **John Ballantyne,** heretofore vice president in charge of operations, has been named president. **M. W. Heinritz,** Trenton, N. J., formerly general manager, storage battery division, was made vice president in charge of the division, and **Charles F. Steinruck Jr.,** assistant secretary, was elected secretary in place of George E. Deming, who died April 15.

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Thomas N. Armstrong, metallurgist since 1935 with development research department, International Nickel Co., is now also part-time staff member, War Metallurgy Committee, National Academy of Science, National Research Council.

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C. C. Hermann, formerly chief engineer, Claud B. Schneible Co., Chicago, has been made general manager, and **L. C. Beers,** formerly district sales representative in Detroit and New England, has been made sales manager.

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C. E. Powell has been appointed manager, machinery department, R. D. Wood Co., Philadelphia.

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Henry D. Miles, formerly president, Buffalo Foundry & Machine Co., 43 Winchester avenue, Buffalo, has been elected chairman of the board and **Charles W. Pearson,** formerly executive vice president, has been made president. **Milo T. Siverling,** a vice president, has been elected executive vice president and general manager, and **L. Clayton Vallier,** formerly treasurer, has been elected secretary and treasurer.

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Arthur W. Richardson has been appointed freight traffic manager, Wabash railroad, St. Louis, succeeding **Charles J. Sales,** recently elevated to general freight traffic manager.

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Carter C. Higgins, general sales manager, has been named a vice president, Worcester Pressed Steel Co., Worcester, Mass.

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J. Paul Ahlbrandt has been named chief engineer, Midwest Mfg. Co., Galesburg, Ill. Mr. Ahlbrandt for past 15 months production engineer, power division, Office of War Utilities, WPB, has formerly been with Ingersoll Steel

and Disc Division, Borg-Warner Corp., Chicago, for eight years.

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N. R. Knox, vice president in charge of manufacturing since 1933, Bucyrus-Erie Co., South Milwaukee, has been made president, succeeding **W. W. Coleman,** company president for 32 years, who has been re-elected chairman of the board. **George A. Morison,** former vice president, has been elected vice chairman of the board. **W. L. Litle** has been made vice president and will be in charge of company's plants at Erie, Pa., and Evansville, Indiana.

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Bernard N. Brockman has been made vice president and general sales manager, R. I. LeBlond Machine Tool Co., Cincinnati, succeeding the late H. C. Pierle. Mr. Brockman, for past eight years in charge of company's Chicago office, will be succeeded by **Donald Whitacre,** who has been with company for 17 years.

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Earl F. Reed, member of the law firm of Thorp, Bostwick, Reed and Armstrong, Pittsburgh, has been elected a director of National Steel Corp., succeeding his former law partner, the late Charles M. Thorp.

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Frederick Salditt, vice president in charge of sales, Harnischfeger Corp., Milwaukee, has been elected a member of the board of directors, succeeding the late Joseph H. Harnischfeger.

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D. E. Whitehead, former superintendent, Wright Aeronautical Foundries, Cincinnati, has been named plant superintendent, National Bronze & Aluminum Foundry Co., and National Aluminum Cylinder Head Co., Cleveland.

N. R. KNOX

BERNARD N. BROCKMAN

Edward A. Beidler, chemical engineer, has been appointed to research staff, division of non-ferrous metallurgy, Battelle Memorial Institute, Columbus, O.

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Gordon LeFebvre, vice president and general manager, Cooper-Bessemer Corp., Mt. Vernon, O., has been elected president to succeed **B. B. Williams,** who declined nomination for re-election. Mr. Williams will continue in active capacity with company, also as chairman of board and chairman of executive committee.

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Robert D. Fisher has been named secretary, Cleveland-Cliffs Iron Co. and Cliffs Corp., Cleveland, to succeed Earl H. Jaynes, retired. Mr. Fisher is at present vice president, secretary and office counsel, Western Reserve University.

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C. H. Weaver has been named manager, marine section, Industrial Department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., succeeding **J. R. Fulton,** who has become assistant to the manager, Industrial Department. Mr. Weaver has been a member of the marine section three years.

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G. C. Brown, formerly sales engineer for Bohn Aluminum & Brass Corp. and Dow Chemical Co., has become Detroit engineering representative for Aircraft Screw Products Co. Inc.

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L. M. Harris has been made general sales manager, Park Chemical Co., 8074 Military avenue, Detroit.

OBITUARIES . . .

August T. Sebelien, secretary and treasurer, Davenport-Besler Corp., Davenport, Iowa, died April 6.

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Perry Critchley Thomas, 55, vice president in charge of coal mines, Koppers Co., Pittsburgh, died April 19 in that city.

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James W. Rickey, 71, former chief hydraulic engineer, Aluminum Co. of America, died April 21, in Washington where he had lived since his retirement in 1937.

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George W. Churchill, 82, retired eight years ago as general manager in Chicago, National Lead Co., died April 20 in Orlando, Fla.

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Thomas J. Bird, 72, structural steel engineer, New York, died in Mount Vernon, N. Y. April 22.

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Horace N. Dougherty, 78, a founder and former vice president, M. H. Treadwell Co. Inc., 140 Cedar street, New York, died in Brooklyn, N. Y., April 21. Mr. Dougherty, who was in charge of sales for the company, was also a director of Treadwell Engineering Co., Easton, Pa., and Treadwell Construction Co., Midland, Pa.

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W. J. Wooldridge, 70, former head of silicon sheet sales, Allegheny Ludlum Steel Corp., died April 6 at his home near Pittsburgh.

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Anson E. Carmean, 59, superintendent, Yankee Truck Body Co., 1224 East Olympic boulevard, Los Angeles, died April 21 in that city.

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William H. Reeves, 70, president-treasurer, Reeves-Skinner Machinery Co., St. Louis, died April 26 in that city.

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Abe Grossman, president, Grossman Iron & Metal Co., St. Louis, died April 24 in that city.

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C. Fred Smith, 59, general manager, casting shops, American Brass Co., Kenosha, Wis., died April 16 at Rochester, Minn.

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Michael J. Grass, 57, founder of M. J. Grass Screw Machine Products Co., Buffalo, died April 23.

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Frank E. Denley, 67, vice president, McCauley Metal Products Inc., Buffalo, died April 11 in St. Petersburg, Fla.

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Paul H. Douglas, 65, engineer, Wellman Engineering Co., Cleveland, died April 27 in that city.

Census Bureau Analyzes Trends; Warns of Changes in Postwar Era

SINCE the Bureau of the Census several months ago announced its findings as to the permanency or transiency of the wartime shifts in population, many business organizations have relocated branch offices and have revised their distribution procedure.

By comparing wartime increases with the rates of growth in normal times of peace the bureau reached certain conclusions.

The following Class A "metropolitan counties" may be expected to retain their population growth, the bureau believes:

Corpus Christi, Dallas and San Antonio, Tex.; Jackson, Miss.; Jacksonville, Fla.; and San Diego, Calif.

Class A-2 areas which grew most rapidly and are believed by the bureau to have superior prospects for retaining their wartime growth are:

Charleston and Columbia, S. C.; Columbus, Ga.; Mobile, Ala.; Washington, D. C.; and Galveston, Tex.

Class A-3 areas which are assumed to have excellent prospects of retaining their wartime growth are:

Atlanta, Ga.; Austin, Beaumont-Fort Arthur, Fort Worth and Houston, Tex.; Chattanooga, Knoxville and Nashville, Tenn.; Detroit and Kalamazoo, Mich.; Little Rock, Ark.; Los Angeles, Sacramento and San Francisco, Calif.; New Orleans and Shreveport, La.

Class A-4 areas considered to have good prospects of retaining their wartime growth are:

Augusta, Savannah and Macon, Ga.; Baltimore; Davenport-Rock Island-Moline, Ia. and Ill.; Denver; Evansville and Indianapolis, Ind.; Norfolk-Portsmouth-Newport, and Richmond, Va.; Portland, Me.; Salt Lake City, Utah; Seattle and Tacoma, Wash.; and Wilmington, Del.

Class B Areas Transient?

Class A-5 areas considered to have fair prospects of retaining their wartime growth are:

Canton, Cincinnati, Columbus, Hamilton-Middletown and Springfield, O.; Chicago and Decatur, Ill.; Fort Wayne, Ind.; Portland, Oreg.; Pueblo, Colo.; St. Louis.

Class B metropolitan counties include those which have grown rapidly during the war but whose growth may be transient unless their wartime activities are successfully converted to normal peacetime functions.

Class B-1 areas, which are those that perhaps may be converted to peacetime functions more easily than the others in the B group, are:

Birmingham, Ala.; Dayton, O.; El Paso, Tex.; Hartford-New Britain, Conn.; Rockford, Ill.; Tulsa, Okla.; Wichita, Kan.

Class B-2 areas where, the bureau believes, it may be relatively difficult to convert from wartime to normal peacetime activities, are:

Bridgeport and New Haven, Conn.; Johnstown, Pa.; Louisville, Ky.; Akron, O.; and Waco, Tex.

The third class of metropolitan centers, Class C, are those which lost population during the war or barely held their own, but which in the light of past performance may be expected to "come back" in the postwar period.

Class C-1 areas that are regarded as having excellent chances of coming back are:

Amarillo, Tex.; Asheville, Charlotte and Winston-Salem, N. C.; Charleston, W. Va.; Lansing, Mich.; Oklahoma City, Okla.; Peoria, Ill.; Stockton, Calif.; Miami, Fla.

Class C-2 areas, which gained very little or barely held their own and which, on the record of past performance, are believed to have excellent prospects of coming back, are:

Durham, N. C.; Madison, Wis.; Memphis, Tenn.; Phoenix, Ariz.; San Jose, Calif.; Tampa-St. Petersburg, Fla.; Waterloo, Ia.

Class C-3 areas which have fair prospects of coming back are:

Cedar Rapids and Des Moines, Ia.; Flint, Mich.; Fresno, Calif.; Huntington, W. Va.; Ashland, Ky.; Minneapolis-St. Paul, Minn.; New York-Northeastern New Jersey; Roanoke, Va.; Spokane, Wash.; Springfield, Mo.; Topeka, Kan.; Youngstown, O.

Class D metropolitan counties are those that decreased or gained very little in the war and which in the light of past performance cannot be expected to grow rapidly in the future.

Class D-1, those which lost population or grew very little during both the war and the depression but which grew at an above average rate or most rapidly between 1920 and 1930—areas that the bureau found it difficult to evaluate, and which well may belie their allocation to this class, are:

Atlantic City, N. J.; Cleveland; Grand Rapids, Mich.; Kansas City, Mo.-Kansas City, Kan.; South Bend, Ind.

Class D-2 areas which grew very little or not at all during the war and which in the light of past experience have little prospect of rapid postwar growth are:

Allentown - Bethlehem - Easton, Erie, Harrisburg, Philadelphia and York, Pa.; Buffalo-Niagara, N. Y.; Omaha, Neb.-Council Bluffs, Ia.; Providence, R. I.; Springfield-Holyoke, Mass.; Terre Haute, Ind.; Trenton, N. J.

Class D-3 areas which in the light of their records are considered to have little prospect for recouping their losses are:

Albany-Schenectady, Troy, Rochester, Syracuse, Utica-Rome, N. Y.; Altoona, Lancaster, Pittsburgh, Reading, Scranton-Wilkes Barre, Pa.; Boston, Fall River-New Bedford and Worcester, Mass.; Duluth, Minn.-Superior, Wis.; Racine-Kenosha, Wis.; Lincoln, Neb.; Manchester, N. H.; Saginaw-Bay City, Mich.; St. Joseph, Mo.; Sioux City, Ia.; Springfield, Ill.; Toledo, O.; Wheeling, W. Va.

The bureau points out that in making these predictions they are based on assumption that the postwar economic order will in general represent a continuation of our national economy as we have known it in the past—and it points out this may be a dangerous assumption.

Developments Influence Change

For example, the large scale use of the mechanical cotton picker may greatly modify the population distribution of the South. Development of the helicopter may result in fundamental redistributions of our population within and among metropolitan centers, between urban and rural areas, and among states. The development of air cargo transport may prove to be a factor that will influence population concentrations.

The bureau warns that population distribution will in a large degree depend upon unpredictable national and international political, economic, social and technological developments. Hence, the above prediction of the postwar population trends in the various areas must be taken only as the picture can be outlined today.

The bureau also points out that in evaluating population trends and shifts, businessmen must take into consideration the fact that areas of stabilized or declining population will become increasingly familiar in the years to come. Such areas, should not be written off as lost or fading markets. Although Pittsburgh and Cleveland, for example, may prove to be stabilized or have somewhat smaller populations, they will retain vast importance as markets.

Albert Kahn Associated Architects and Engineers Inc., Detroit, have been presented a certificate of commendation by the Bureau of Yards and Docks, Navy Department, in recognition of their work in designing building and facilities.

Stabilization Effort Reaches Critical Stage

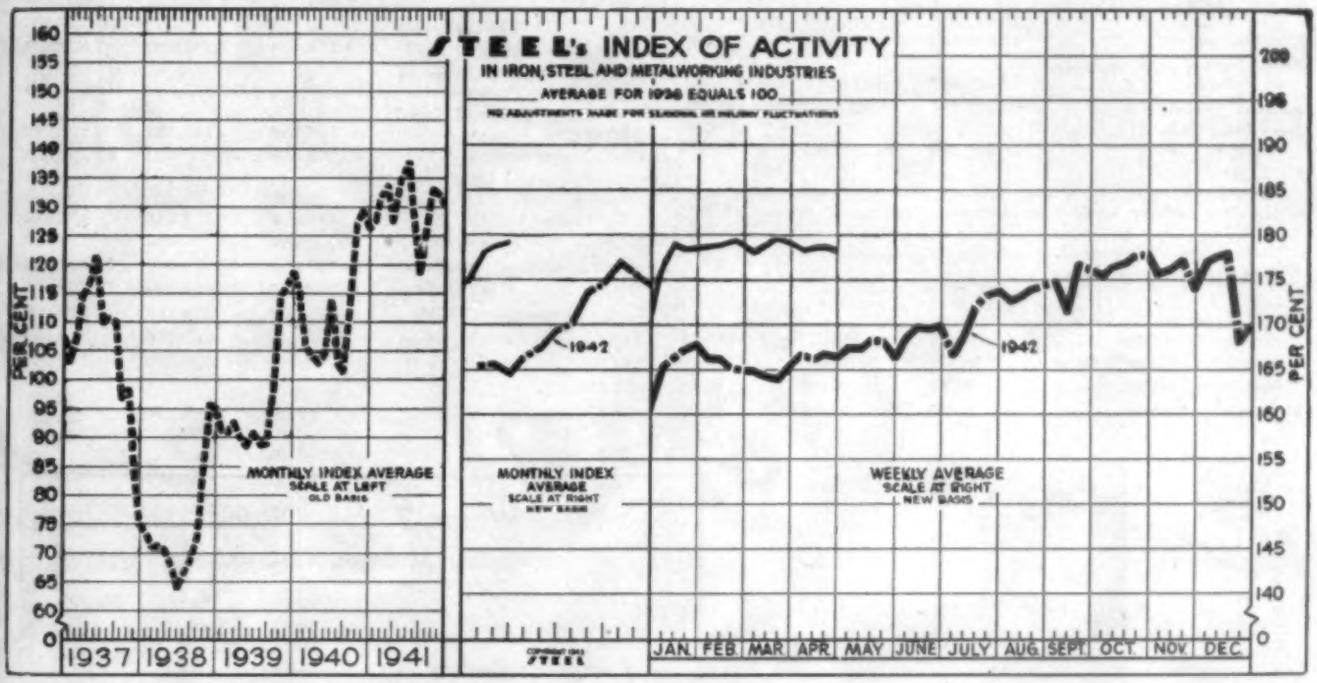
CURRENT wage and farm price controversies, highlighted by the coal situation, are putting the government's stabilization program to the test. Regardless of the President's "freeze" order and a growing opposition to minority pressures, the miners are expected to get some of the increases asked for, while farmers may win near-parity prices through a process of "hardship" appeals.

Situation on the food front is improved, official opinion holding that farmers are less anxious for better prices than they are for generous guaranties against a bottomless market.

After reaching record levels, coal production began to taper off in recent weeks, possibly due to the dissatisfaction over deadlocked negotiations. Output of bituminous coal in March, 49,960,000 tons, represented the third successive monthly increase of over a million tons, and it appeared for a time that the 1943 goal of 600,000,000 tons might be reached. There is at present barely six weeks coal supply on hand and there may be repercussions in industry if the issue is not quickly resolved.

First alarms over possible effects of proposed concentration of industry abated after Mr. Nelson's assurance that the plan is not feasible except for special cases where by standardization of product a limited amount of essential civilian production is made possible.

Generally, industrial activity has settled on a level close to the high point attained two months ago. STEEL's index of activity closed the four weeks to April 24 at 178.7, down 0.3 point from the monthly average for March and only 0.1 point under the index figure for February, indicating the effects of production shifts now taking place as a result of over-production in a few categories and limita-



STEEL'S index of activity declined 0.3 point to 178.5 in the week ending April 24:

Week Ended	1943	1942
April 24	178.5†	166.4
April 17	178.8	166.7
April 10	178.8	166.2
April 3	178.5	166.7
Mar. 27	179.2	165.5
Mar. 20	179.6	163.9
Mar. 13	179.0	164.1
Mar. 6	178.2	164.8
Feb. 27	178.9	165.0
Feb. 20	179.6	165.1
Feb. 13	178.8	166.2

†Preliminary.

Mo. Data	1943	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932
Jan.	178.1	165.7	127.5	114.7	91.1	75.3	102.9	85.9	74.2	58.8	48.6	54.6
Feb.	178.8	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.5
March	179.0	164.6	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2
April	....	166.7	127.2	102.7	89.8	70.3	116.6	100.8	85.0	83.6	52.4	52.8
May	....	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8
June	....	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4
July	....	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.5	63.7	77.1	47.1
Aug.	....	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0
Sept.	....	174.8	126.4	113.5	98.0	72.3	96.8	86.7	69.7	56.9	68.0	46.5
Oct.	....	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	49.4
Nov.	....	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.8
Dec.	....	174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production

tions imposed by strained transportation facilities.

In March the steel industry exceeded all prior monthly records for production, making 90,000 tons more steel than in October, 1942, previous peak month during which 7,579,514 tons were produced. Weekly average output of ingots was 1,731,419 tons, also a record. It compares with 1,668,829 tons in the like month a year ago and 1,702,970 last month. Finished steel shipped by the United States Steel Corp. in March reached 1,772,397 tons, a slight reduction from the comparable 1942 period but 80,805 tons over previous month.

Index of the American Gear Manufacturers' Association rose to 334 during the month from 303 in February, while new orders for foundry equipment restored that index to 562.7, approximately half way to the record level of March, 1942.

Weekly average of freight car loadings in March was 768,356, against 766,500 in February.

BUSINESS BAROMETER

Financial Indicators

	March, 1943	Feb., 1943	March, 1942
30 Industrial Stocks*	$131.15	$127.40	$101.62
20 Rail Stocks*	32.47	29.80	26.09
15 Utilities*	17.58	16.87	12.15
Average Price of all listed bonds (N.Y.S.E.)	$98.24	$97.79	$95.97
Bank Clearings daily average (000 omitted)	$1,400,081	$1,394,432	$1,161,204
Commercial Paper, interest rate (4-6 months)	0.67	0.67	0.56
Com'l loans (000 omitted)‡	$9,456,000	$9,643,000	$9,457,938
Federal Reserve ratio (per cent)	77.7	77.4	90.9
Capital flotations (000 omitted)			
New Capital†	$57,900,000	$6,670,000	$123,775,000
Refunding†	44,406,000	169,750,000	56,508,000
Federal gross debt (millions of dollars)	$115,507	$114,024	$62,464
Railroad earnings†	$106,132,776	$105,296,534	$64,345,273
Stock sales, New York Stock Exchange	36,997,243	24,434,080	8,580,000

*Dow-Jones series. †February, January, February, respectively.
‡Leading member banks Federal Reserve System.

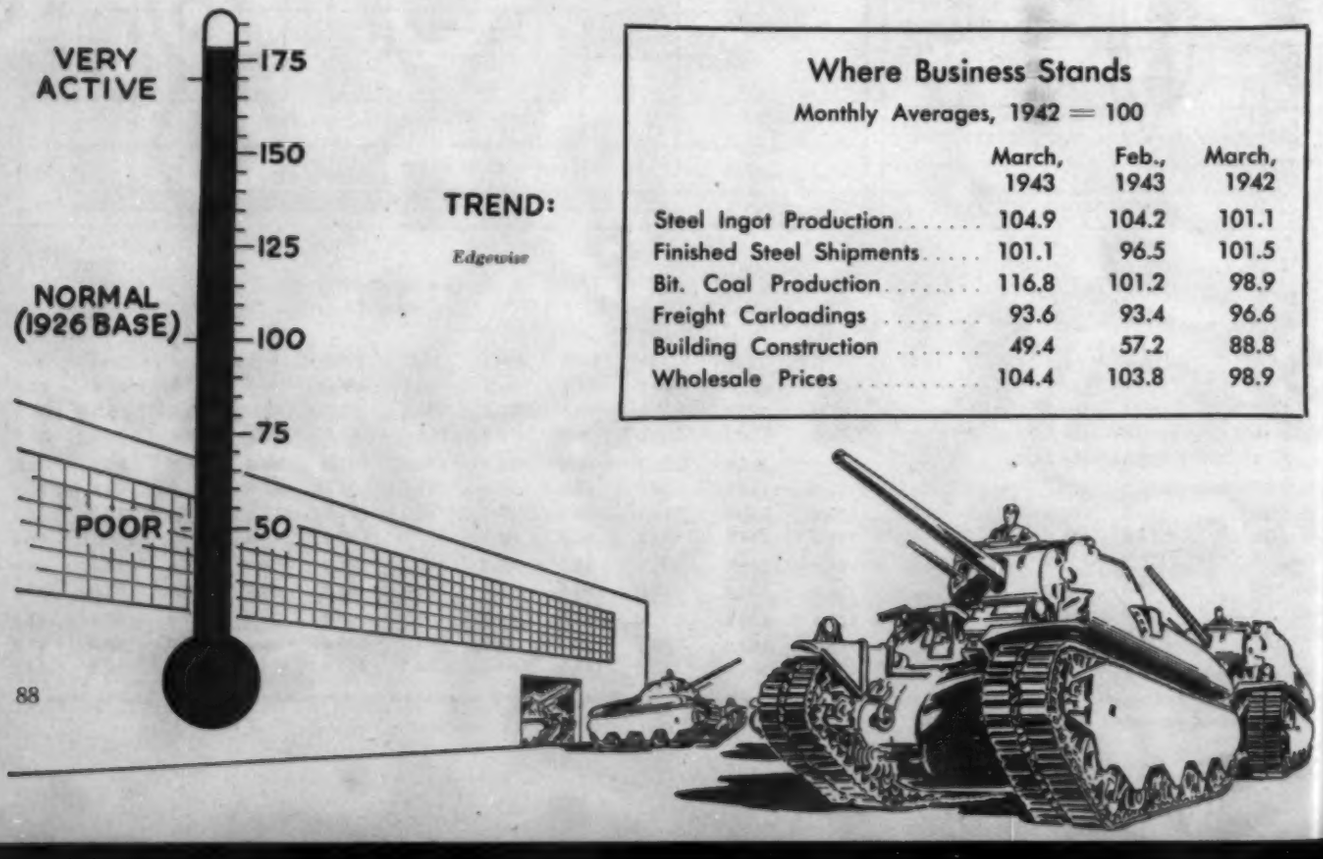
Commodity Prices

STEEL's composite finished steel price average	$56.73	$56.73	$56.73
U. S. Bureau of Labor's Index	103.1	102.5	97.6
Wheat, cash (bushel)	$1.69	$1.66	$1.25
Corn, cash (bushel)	$1.15	$1.15	$0.97

Industrial Indicators

	March, 1943	Feb., 1943	March, 1942
Commerce Dept.'s Mfgs. Index†			
Orders	280*	247	292
Shipments	256*	226	199
Inventories	175.7*	177.8	163.0
Industrial Production Index (Federal Reserve Board)	203*	202	172
Iron and Steel Scrap consumption (tons)†	4,361,000	4,753,000	4,276,000
Gear Sales Index	334	303	455
Foundry equipment new order index	562.7	399.5	1122.4
Finished steel shipments (net tons)	1,772,397	1,691,592	1,780,938
Ingot output (average weekly; net tons)	1,731,419	1,702,970	1,668,829
Dodge bldg. awards in 37 states ($ Valuation)	$339,698,000	$393,517,000	$610,800,000
Fabricated structural steel shipments (Tons)†	104,836	105,832	153,732
Coal output, tons	49,960,000	48,920,000	47,400,000
Coke Production (Daily Av.)			
Beehive†	23,991	21,440	22,554
By-Product†	175,009	174,044	168,414
Business failures; number†	422	458	916
Business failures; liabilities†	$4,163,000	$5,515,000	$9,631,000
Cement production, bbls.†	10,293,000	12,560,000	10,797,000
Cotton consumption, bales	995,000	878,154	967,000
Freight Car Awards	0	350	4,080
Car loadings (weekly av.)	768,356	766,500	792,860

*Preliminary. †February, January, February, respectively.



Where Business Stands

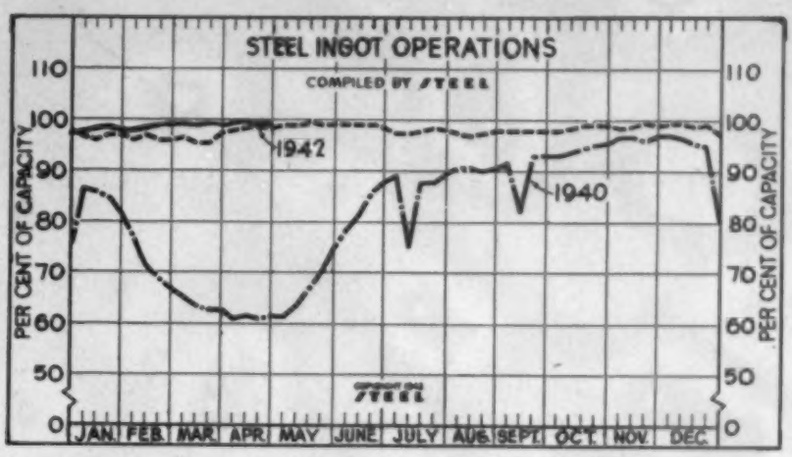
Monthly Averages, 1942 = 100

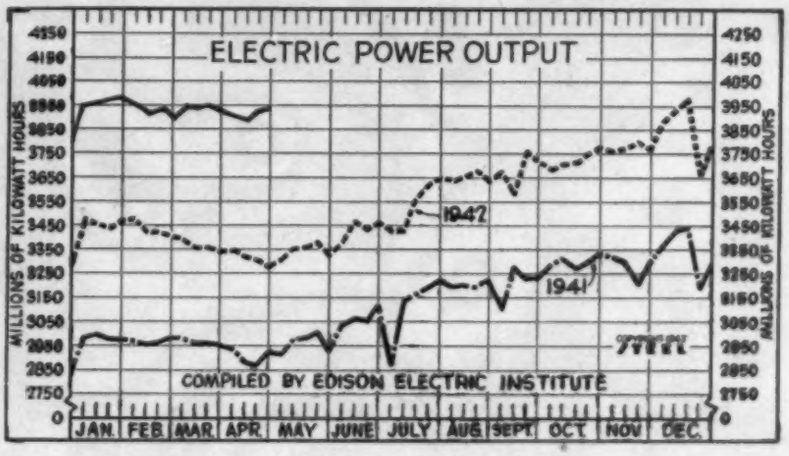
	March, 1943	Feb., 1943	March, 1942
Steel Ingot Production	104.9	104.2	101.1
Finished Steel Shipments	101.1	96.5	101.5
Bit. Coal Production	116.8	101.2	98.9
Freight Carloadings	93.6	93.4	96.6
Building Construction	49.4	57.2	88.8
Wholesale Prices	104.4	103.8	98.9

Steel Ingot Operations

(Per Cent)

Week ended	1943	1942	1941	1940
April 24	99.0	98.5	96.0	61.5
April 17	99.0	98.5	98.0	61.5
April 10	99.5	98.5	98.0	61.0
April 3	99.5	98.0	98.0	61.5
Mar. 27	99.0	97.5	99.5	61.0
Mar. 20	99.5	95.5	99.5	62.5
Mar. 13	99.0	95.5	98.5	62.5
Mar. 6	99.5	96.5	97.5	66.5
Feb. 27	99.5	96.0	96.5	65.5
Feb. 20	99.5	96.0	94.5	67.0
Feb. 13	99.0	97.0	96.5	69.0
Feb. 6	98.5	96.0	97.0	71.0
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	81.5
Jan. 16	99.0	96.0	94.5	84.5
Jan. 9	97.5	96.5	93.0	86.0




ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Electric Power Output

(Million KWH)

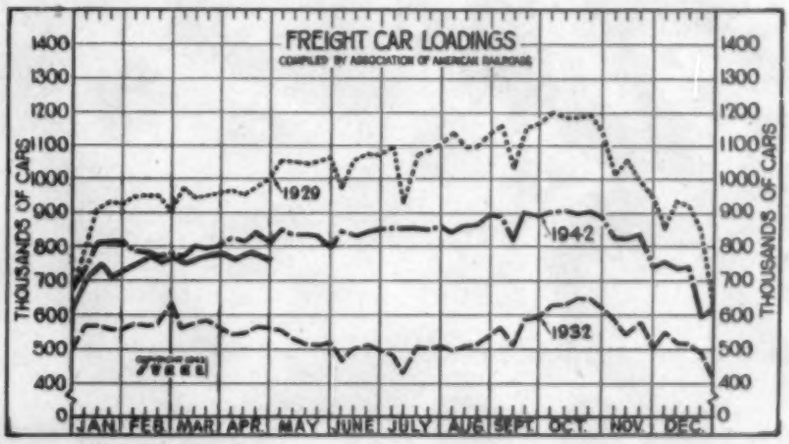
Week ended	1943	1942	1941	1940
April 24	3,925	3,273	2,750	2,398
April 17	3,917	3,308	2,702	2,422
April 10	3,882	3,321	2,721	2,418
April 3	3,890	3,349	2,779	2,381
Mar. 27	3,928	3,345	2,802	2,422
Mar. 20	3,947	3,357	2,809	2,424
Mar. 13	3,945	3,357	2,818	2,460
Mar. 6	3,946	3,392	2,835	2,464
Feb. 27	3,898	3,410	2,825	2,479
Feb. 20	3,949	3,424	2,820	2,455
Feb. 13	3,989	3,422	2,810	2,476
Feb. 6	3,960	3,475	2,824	2,525
Jan. 30	3,977	3,468	2,880	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,958	3,473	2,985	2,685
Jan. 2	3,780	3,289	2,831	2,558

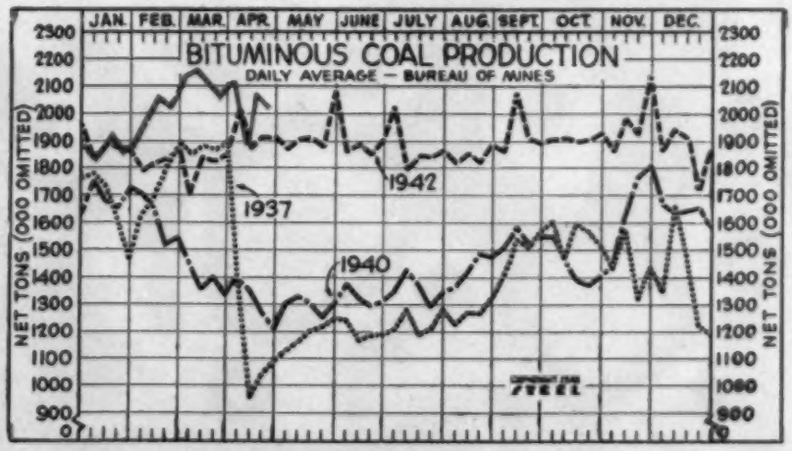
Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
April 24	759†	816	722	644
April 17	781	847	709	628
April 10	789	814	680	619
April 3	772	829	683	603
Mar. 27	787	805	792	628
Mar. 20	768	797	768	620
Mar. 13	760	799	758	619
Mar. 6	748	771	742	621
Feb. 27	783	781	757	634
Feb. 20	752	775	678	595
Feb. 13	765	783	721	608
Feb. 6	755	784	710	627
Jan. 30	735	816	714	657
Jan. 23	709	818	711	649

†Preliminary.




BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Bituminous Coal Production

Daily Average

Net Tons (000 omitted)

Week ended	1943	1942	1941	1937
April 17	2,025†	1,919	233	1,041
April 10	2,067	1,875	200	953
April 3	1,858	2,019	665	1,381
Mar. 27	2,108	1,858	1,950	1,895
Mar. 20	2,060	1,825	1,879	1,871
Mar. 13	2,100	1,842	1,844	1,883
Mar. 6	2,125	1,693	1,791	1,851
Feb. 27	2,113	1,878	1,786	1,897
Feb. 20	2,027	1,833	1,736	1,807
Feb. 13	2,033	1,817	1,736	1,696
Feb. 6	1,980	1,793	1,683	1,634
Jan. 30	1,990	1,866	1,684	1,466
Jan. 23	1,867	1,886	1,656	1,605

†Preliminary.

British Progress in . . .

TRAINING

O.W.I. Photo
Drawing by R. D. Book

THE GREATEST PROBLEM that we have had to face is that of training" was the remark of the British Minister of Labour and National Service that hit the nail on the head.

By far the greater amount of training to meet employers' needs must be carried out by the employers themselves in their own factories has been British experience. The Ministry of Labour and National Service advises upon and stimulates such training wherever possible, and visits to employers are made by special officers for this purpose. Nevertheless, a heavy call has been made on the training facilities provided under the government training schemes.

A number of government training centers had been adapted for the training of women by the end of 1940. The first women entered training in January, 1941. By the end of 1941, all the centers had been adapted. More than half the trainees now attending are women or girls, and this proportion is increasing progressively. Indeed, the recruitment of men for training is now normally restricted to those outside military age, with the exception of the lower medical categories.

As expansion of training involved a serious shortage of qualified instructors, a special course on instruction was instituted to embrace the principles of teaching and procedure, and to revive latent technical knowledge. Towards the end of 1941, more elasticity of training was introduced to meet the changing requirements in industry, and modifications were made in the length of the various training courses. These were related more closely to the capability of the individual trainee, and to the requirements of the particular branch of industry for which he or she was destined.

Short courses of from four to eight weeks were introduced. The longer courses up to 16 weeks were reserved for trainees likely to profit by extended instruction, and for industrial operations calling for specified training. Government training is essentially flexible, and the biasing of training to meet the special production processes of individual employers has been fostered. Training is also rapidly adaptable to meet the urgent needs of particular branches of industry. An instance of this was the urgent call for additional welders arising from the increasing demand in munitions production.

To assist in meeting this urgent need, training in welding at the government training centers was completely reorganized, in consultation with the Institute of Welding and other bodies. Women would necessarily be employed on the widest possible range of welding operations, and the training was carefully graded with this in view. In the government training centers alone there is now a large capacity for instruction in arc welding and gas welding. Operating on

From publications of the British Ministry of Labour and National Service, reproduced in this country by Training Within Industry, War Manpower Commission.

a three shift system, it is possible to train some 5000 welders yearly.

Recent developments are concerned with the training of the worker who is not available for full-time employment in industry. Part-time training can now be given in technical colleges and government training centers to housewives and other women, where local circumstances permit their subsequent part-time employment.

Another development is the organization of background courses in connection with the Women's Technical Service Register. Some of the courses meet the normal requirements of inspection departments and drawing offices, and now arrangements have been made to provide training that furnishes a general background knowledge of engineering processes to those otherwise qualified for technical posts.

The widest degree of co-operation with industry is a cardinal principle of the government training schemes. Wherever possible, training is biased towards the needs of known requirements. Many firms have co-operated by providing, for special processes, both the materials and machinery, so that recruits whom they will employ will be versed in the actual operations for which they are needed.

It has been possible at some centers to undertake production work for local firms where this can be arranged to fit in with the syllabus of training. A notable example occurs at a Midland center where 20 machines have been set apart for such work. Production is, however, always subordinated to training, and is only undertaken when it serves that primary interest.

Selection of Apprentices: Nobody will deny that the first essential of any apprentice training scheme is that *suitable* apprentices should be selected. One leading aircraft firm recognized the importance of this, and realized also the inadequacy of the usual methods of selection; the general standard was insufficiently high, and too large a proportion of their apprentices proved to be unsuitable. Consequently, a research was undertaken, and some important facts were brought to light.

About 100 apprentices, who had been in the firm for upwards of three years, were given a number of aptitude tests devised by the research staff of the National Institute of Industrial Psychology; also a well-tried intelligence test as devised some years ago by Professor Cyril Burt. The object of the research was explained to the pupil apprentices and to the older trade apprentices, who were asked for their own frank ideas of their suitability or otherwise for work of an engineering nature.

No less than 17 per cent of the pupil apprentices—a very disturbing figure—volunteered their impression that they were unsuitable. There were also a number of others who were obviously unsuitable.

This question of suitability is fundamental. In the past it seems to have been imagined that provided a boy was intelligent, as shown by his school record, and possessed reasonably good personal qualities, he would make, for example, a good pupil apprentice. But research carried on in the last few years by psychologists, and particularly by the staff of the National Institute of Industrial Psychology, by Miss Patricia Allen and Mr. Percival Smith, under the auspices of the Birmingham Education Committee and by Dr. Stanbridge, of the Royal Air Force, has shown the existence of certain aptitudes—potential abilities—which are relatively distinct from general intelligence.

In the majority of engineering occupations and in certain others, these aptitudes are of considerable importance. Hence, boys of admittedly high intellectual level may fail through a lack of some of these aptitudes. This proved to be so with the great majority of the apprentices who considered themselves unsuitable.

The vocational tests referred to assess (with considerable accuracy, as the research subsequently proved), an aptitude or an allied group of aptitudes of great importance in engineering; namely, the "spatial factor" closely associated with practical ability. The skilled tradesman, for instance, is concerned with the reading of drawings; and draftsman with the making of them. One process involves the visualization of a three-dimensional *solid* object from a two-dimensional *flat* representation of it; the other the reverse.

These abilities are assessed extremely well by the battery of aptitude tests applied during the research. Although a good level of intelligence is not sufficient for success at, for example, technical work, it is obviously necessary. The following conclusions indicate a few of the main results obtained during this illuminating experiment:

—The general standard of apprentice efficiency has been raised noticeably.

—The successes of apprentices in their studies and examinations show a most marked improvement.

—The percentage of apprentices now being rejected at the end of their six months' probationary period has decreased practically to zero.

—The value of a broad recruiting policy has been demonstrated unmistakably. During 1941 the firm accepted a substantial number of apprentices, who all took the entrance tests. The following figures show how various sources contributed to successful candidature:

Boys recommended by schools with whom contact had been maintained, 78 per cent accepted.

Boys already in the firm, and who applied, 30 per cent accepted.

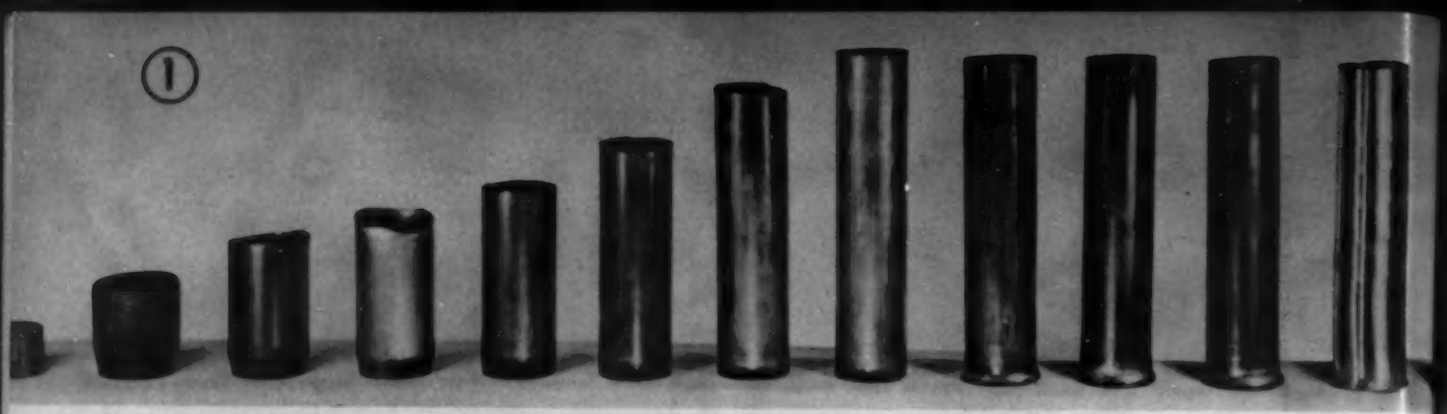
Boys who were the subject of the usual letter of application, 12½ per cent accepted.

It is believed that industrial firms and schools *must* maintain close contact. If the best results are to be obtained, both sides should realize that their needs are complementary in the matter of selecting and placing respectively.

A statistical study of the stated interests and hobbies of the existing apprentices shows these interests to be of very restricted value for selection purposes.

During the last three years, school reports—often ten or more for each boy for 150 boys—have been studied carefully. As a guide to subsequent success, they have proved of limited value, particularly because of their almost complete lack of evidence of the necessary aptitudes; but they are useful if referred to a boy's test scores and should be re-

(*Please turn to Page* 124)



STEEL CARTRIDGE CASES

....and how Buick makes them

SUBSTITUTION of steel for brass in cartridge cases is a logical step in conservation of critical metals as an all-out "shooting war" moves closer. While cases for the larger sizes of ammunition often can be salvaged and some of them re-used, millions of rounds of cartridge cases never can be recovered from the heat of battle, resulting in the loss of appreciable quantities of brass. Steel, since it is available in many times the tonnage of brass and since it is less expensive, becomes a natural alternate material.

But the mere decision to substitute one metal for the other is by no means the end of the problem—it is only the beginning. Steel and brass have completely different properties, in fabrication processes and during the firing cycle in a gun. Steel is harder with greater tensile strength and higher yield strength. Brass is more easily worked, has better frictional properties in a gun chamber, is more corrosion resistant and is non-sparking.

How to bring these variations into balance so that a steel cartridge case can be furnished the military services which will be interchangeable with brass was a

Fig. 1—Series of case sections showing sequence of principal operations, starting from slug

Fig. 2—First heating operation in electric induction heater. Gas flame provides protective atmosphere. Heating for hot extrusion and redraw

Fig. 3—First hot press. Piece is shown in open dies, ready for press to operate

Fig. 4—Second hot press operation sizes wall thickness, is called redraw

Fig. 5—Annealing furnace. Note handling facilities, roller conveyor around from back of unit, dump truck at unloading end

Fig. 6—Closeup of press on which the four cold drawing operations are accomplished in sequence in dies located at four corners of working area of this unit

problem testing the "know-how" of metallurgists and metalworking experts. Now, however, it appears to have been solved. Steel cases in several sizes are now in production. Hundreds of thousands already have been supplied to the armed forces.

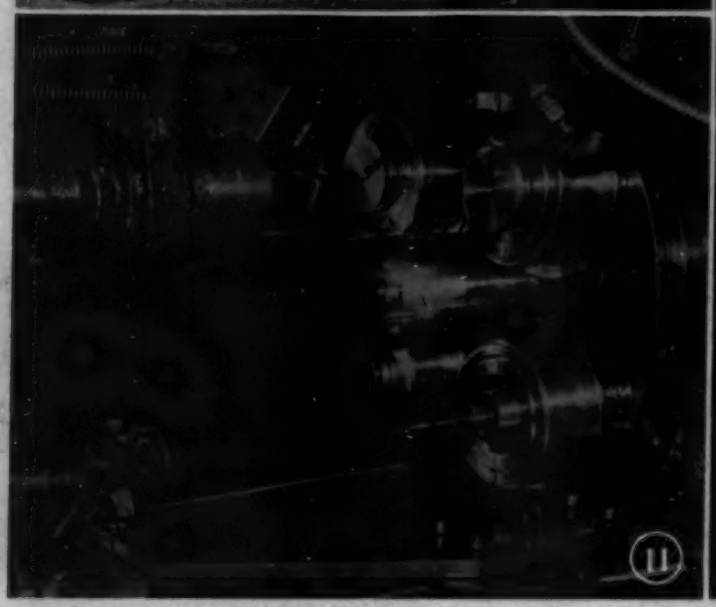
Directing and correlating the work of a score of metalworking companies on steel shell cases has been a special ordnance-industry committee operating under Major General Levin H. Campbell, chief of ordnance. This article will review the progress of one company—Buick Motor Division of General Motors Corp.—which since July, 1941, has had its engineers and metallurgists actively studying the manufacture of steel cartridge cases in the larger calibers, to the end that at the present time a 75 millimeter steel shell case is in mass production.

Buick's early work on the project was done at the request of the Navy Department. Engineers and process men selected the 5-inch (127-millimeter) shell for initial experiments and decided to build dies one-third full size to determine whether the fabricating operation could be performed as they visioned it. Briefly what they sought to do was to extrude a hot cylindrical slug of steel into cup shape, flowing the metal hot up the post or punch of the die set; then to cold draw this cup by several stages into the proper length and wall thickness, then to cold head the base of closed end, stress relieve and finally machine and finish.

Early experimental work proved suc-

TABLE I—Sequence of Operations

1. Cut off slug in power saw.
2. Chamfer ends in lathe.
3. Centerless grind the outside diameter.
4. Inspect by magnaflux.
5. Alkali wash.
6. Heat in induction-type electric heater.
7. Hot cup in 1000-ton press to about 4-inch depth.
8. Air cool and redraw in press to about 6-inch depth.
9. Size wall thickness in press, drawing out only slightly.
10. Anneal in gas pusher-type furnace.
11. Acid pickle and rinse to clean scale.
12. Restrike head to size.
13. Etch and clean surface with Bonderite D in tanks.
14. Anneal to remove hydrogen embrittlement resulting from pickling.
15. Trim mouth end on automatic trimmer.
16. Four consecutive cold drawing operations on single press with four stations.
17. Inspection for scratches, size, out-of round, cold shuts, etc.
18. Trim mouth and burr edge.
19. Alkali wash.
20. Treat again with Bonderite D solution.
21. Cold head in two-stage die (three strokes in press).
22. Wash.
23. Flame anneal about 2 inches down from mouth end.
24. Two tapering operations cold in two-station press.
25. Flame anneal mouth to depth of about 3½ inches.
26. Wire brush inside.
27. Machine base and rough bore primer hole on automatic lathe.
28. Face to length within 0.040-inch.
29. Burr mouth and gage size.
30. Fin ream and counterbore primer hole.
31. Alkali wash.
32. Polish with 120 grit emery wheels, removing about 0.0025-inch from diameter.
33. Burr counterbore inside.
34. Gage and inspect throughout.
35. Mark the part number.
36. Stress relief for one hour and twenty minutes.
37. Light acid dip.
38. Treat again with Bonderite D solution.
39. Spray inside and out with phenolic varnish.
40. Bake for 48 minutes at 360 degrees between banks of infra-red lamps.
41. Pack and ship.



cessful and as a result of meetings with General C. M. Barnes and Colonel C. E. Turner of Army Ordnance, Buick engineers re-directed their attention to the production of a 75-millimeter steel case. The Ordnance Department, through its various arsenals, had been pursuing investigational work on steel cases, principally for the 90-millimeter steel, the method involving essentially cold drawing the case from a high-carbon steel which had been given a spheroidizing anneal (that is, carbon diffused throughout the steel in the form of spheroidized cementite), and a final heat treatment to develop necessary physical requirements.

This differs markedly from the essential Buick process which starts with low-carbon steel and develops the physical properties by intensive cold work and a final stress relief heat treatment. Both processes aim at a minimum point in the steel case of something over 100,000 pounds per square inch.

To understand the reason for this high yield point, it is necessary to examine the functioning of a case in firing. The loaded case is placed in the gun chamber with a loose fit, perhaps 0.010-inch clearance all around. When the explosive charge is detonated inside the case, the metal of the case is forced out against the gun chamber to make a gas-tight fit and direct the full force of the explosion against the projectile. After the latter has been expelled the case must contract sufficiently to permit ejection from the gun barrel, which may be either hot or cold, depending on combat conditions. In other words, the case cannot take a permanent set (exceed the yield point) or it will stick in the gun.

Now, because brass has a modulus of elasticity of 9,000,000 foot-pounds, against 30,000,000 foot-pounds for steel, the stress to produce a given amount of strain in brass is far less than for steel. Hence, a steel must be provided which will show a yield point or yield strength permitting equivalent strain to that encountered in the brass case. This may sound complicated, but it can be readily understood by referring to a

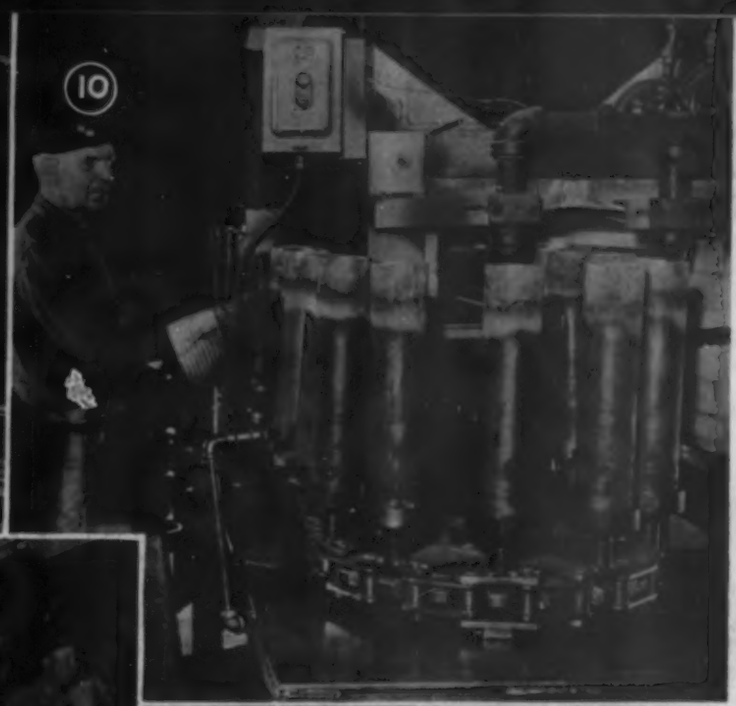


chart of stress-strain curves for steel and brass.

To avoid the need for final heat treatment and its possible accompanying distortion, particularly in a thin-walled section like a cartridge case, Buick metallurgists concentrated on selection of a steel that could be cold worked to provide the necessary yield strength. They realized that it might be unwise to choose too low a carbon content due to the danger of the steel sticking in the dies during forming. So they decided to try an SAE-X1015 steel which was on hand and had been used at one time as side-gear stock. Hot cupping and two cold draws in the 75-millimeter case size

(*Please turn to Page* 135)

Fig. 7—Overall view of 750-ton press used for the four simultaneous cold drawing operations shown in Fig. 6

Fig. 8—Automatic case trimmer uses rotary cutting blade at left center

Fig. 9—Cold-heading press with two-stage die

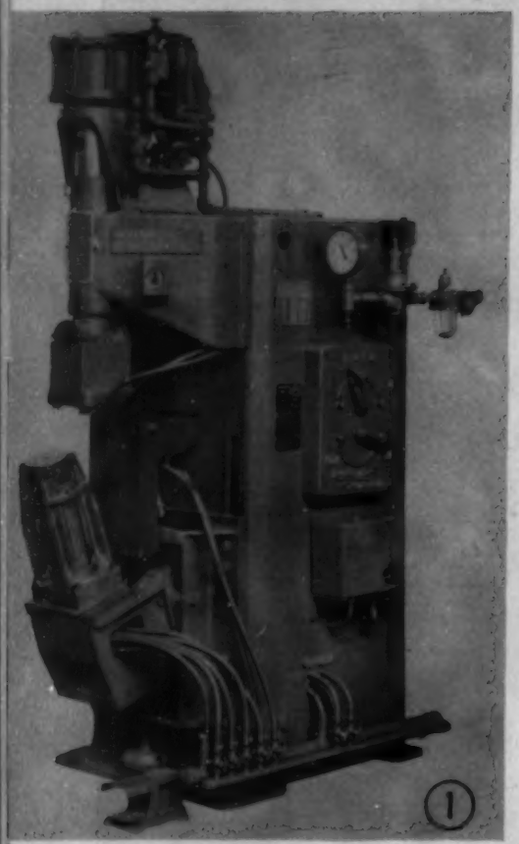
Fig. 10—Special furnace employs open flame burners placed horizontally on each side of line of cartridge cases which are annealed as the conveyor carries them through the unit

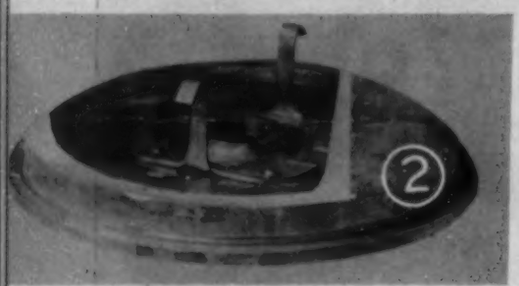
Fig. 11—Closeup of automatic lathe for machining base, with cases in position. Loading-unloading station at bottom

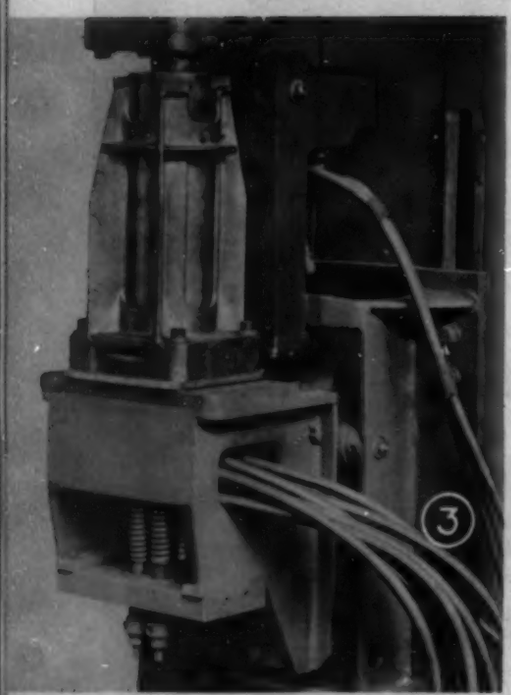
Fig. 12—General view of machining line where bases are faced; flanges formed; primer holes drilled, reamed and counterbored. Note inspectors along conveyor line

Fig. 13—Fixture and setup for automatic spraying of phenolic varnish. The two automatic spray heads are indicated by the arrows. One head goes down inside case, other sprays from side as case rotates. Water curtain at extreme left carries away overspray

WELDING POWDER BAG CLIPS TO CARTRIDGE CASES







POWDER bag clips are now being successfully projection welded to 75 and 105-millimeter shell casings, as shown in Fig. 2, by means of air-operated press welders with a special knee fixture. Formerly these clips were screwed to the cases, but in order to reduce costs the welding method has been developed.

The shell-holding fixture consists of a knee which is the same length as the shell to be welded. On top of the knee is a fiber locator plate for the clips. Four independently spring-loaded and insulated electrodes are spaced around the knee. The heavy springs can be seen in Fig. 3. A four-pronged steel cage into which the shell is inserted, base up, surrounds the electrodes. Steel locator blocks into which the shell base fits are mounted on top of the four prongs.

In operation, the knee fixture is swung forward into loading position by an air cylinder, and the two clip halves of 0.050-inch thick cartridge brass with welding projections already formed are placed on the fiber locator plate mounted on top of the knee. The shell is then pushed forward into place against locator blocks on the cage as shown in Fig. 1. Operator next steps on foot pedal visible in Fig. 1 and 3, which starts automatic operating cycle in which knee is first pivoted back into welding position, pressure head is brought down (Fig. 3), weld is made, head is lifted and knee is swung out to the loading position. Cartridge case then is removed, another pair of clips and a case are inserted, and the cycle is repeated.

One of these machines with two operators has produced as many as 3700 cases on a 7-hour shift with a maximum speed of 10 to 11 cases per minute. Each clip half is welded in two spots as can be seen in Fig. 2. Both single-piece and split clips have been tried, but use of the split clip saves brass, assists in "nesting" the clips during stamping and lowers the power demand when welding.

The projection size is rather critical on this job as it must be large enough not to flash off, yet not so large as to crumple in too easily. It has been found that projections 0.125-inch in diameter at the base, dome-shaped and 0.040-inch high give best results. Under test, clip ears straighten out at about 150 pounds per ear, but welds do not break. Under a tensile load of 200 to 250 pounds per projection, the welds tear out buttons.

Operating on 220 volts at 60 cycles, the welding machine is equipped with a fully synchronous timer using two size C tubes. Air cylinder has an insulated pressure pad instead of an upper die as its only function is to press the shell until the rim on the shell base seats on the steel locator blocks and the four independently spring-loaded electrodes are compressed.

Welds are made on the Taylor-Winfield machine with a total demand of

(*Please turn to Page* 144)

TABLE I—Welding of Cartridge Clips

Trans. Tap	Turns Ratio	Pri. Imp.	Amps./Proj.	KVA Demand	Time	Press./Proj.
L-4	23	0.13	15,300	231	10 Cy.	300 lbs.

Voltage Data

Tap	L-1	L-2	L-3	L-4	L-5	L-6	L-7	L-8
Turns Ratio	29	27	25	23	21	19	17	15
Sec. Volts	7.59	8.15	8.80	9.56	10.5	11.58	12.80	14.65

Impedance Data—Shell in Place, Clip Welded

Trans. Tap	Turns Ratio	Max. KVA	Pri. Imp.	Power Factor	Max. Current
H-4	15	1100	0.0442	70%	74,700 Amps.

Fig. 1—Direct air-operated press welder with special knee fixture for welding powder bag clips to bases of 105-millimeter cartridge cases

Fig. 2—Base of cartridge case cut away to show how clips are welded to base inside the case. Two projection welds are made on each of the two clips

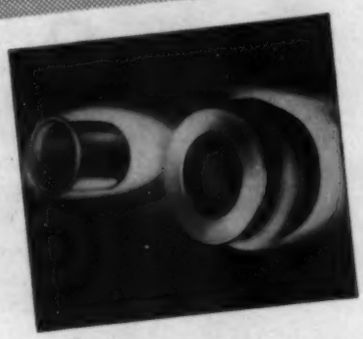
Fig. 3—Closeup of welder with knee in welding position. Compare with Fig. 1 to see how knee has been pivoted to bring work under upper head of welder. Note the four sets of hose connections to the electrodes which extend up inside the cartridge case, the four heavy springs which place pressure on the individual electrode tips

How to REDUCE Machine Shut-Down Time

by getting longer runs between grinds

Certainly one of the biggest problems of all-out production is finding ways to prevent loss of machine time caused by frequent shut-downs to redress, regrind or replace tools that wear too rapidly or fail too soon. If *you* could get ten minutes to several hours' extra production time per day from each machine in *your* plant, wouldn't it make *your* production schedules easier to meet?

Many busy war plants have found a way to do just that—by using the Carpenter Matched Set Method of tool steel selection. Because it provides a definite *system* for selecting the one steel that is best for each tool, this method helps to get tools that give uninterrupted production—that run longer between grinds. Given here are two actual production line examples of how it works.



42 More Productive Hours Per Month Per Press

THE JOB: Drawing a bearing retainer out of plain hot rolled steel ⅛" thick. Rated capacity of press, 1,250 pieces per hour.

THE PROBLEM: Oversize wear after 4,000 pieces —replacement of tool with duplicate consumed 1 hour during which press was idle.

THE SOLUTION: A change in tool steels in the direction indicated by Carpenter's Matched Set Method of Tool Steel Selection.

THE RESULTS: An increase in *tool life* from 4,000 pieces to 86,000 pieces per tool. A decrease in press shut-down time of 42 full working hours per month. A gain in production of 52,500 pieces per month.

63.8 More Productive Hours Per Month Per Press

THE JOB: A fast blanking operation on a press operating at 7,200 pieces per hour.

THE PROBLEM: Burrs after every four hours, necessitating 2½ hours shut-down time for pulling the die, regrinding and replacing.

THE SOLUTION: The company switched to the steel indicated by the Carpenter Matched Set Method.

THE RESULTS: An increase in time between grinds from 4 hours to 35.8 hours. A decrease in press shut-down time of 63.8 hours per month. An increase in production of 460,000 pieces per month.

If you are interested in getting more output in *your* plant, the Matched Set Method can help you. A request on your company letterhead will bring you helpful information about it. Or for "on the spot" service, your Carpenter representative will be glad to give you every assistance.

The Carpenter Steel Co., **139 Bern St., Reading, Pa.**

Carpenter
MATCHED
TOOL STEELS

draw straightening

OF HEAT-TREATED PARTS

Other sections in this series on methods of controlling and correcting distortion resulting from the heat treatment of certain types of parts are: Section I, STEEL, March 15, p. 114, on oil-hardening steels; Section II, March 29, p. 74 on carburizing steels; Section III, April 12, p. 112 on torch spotting

By G. B. BERLIEN
Chief Metallurgist
Lindberg Steel Treating Co.
Chicago

THERE ARE certain types of parts which cannot be prevented from distorting in the quench, due mainly to their design. Light, flat sections of comparatively large area are in this category, as are long slender parts. Also included are such parts as gears, shear blades, etc.

Generally speaking, if these parts are of a steel that hardens all the way through, they can be straightened successfully by drawing or tempering in a fixture. Before clamping up the parts tightly, however, it is necessary that they be given a draw at a lower temperature than the final draw in order to prevent them from cracking when clamped in the fixture.

Fig. 3 shows such a job. Parts are carbon spring steel, oil quenched. At the right is a small stack of the parts as they come from the quench tank. It will be noticed that they are distorted considerably. In the center is a stack of the parts set up for the preliminary draw. The only tension on the parts here is from the spring. The parts are drawn in this fixture at 500 degrees Fahr. Then they are transferred to the fixture shown at the left, in which they are tightly clamped and given a final draw of 675 degrees Fahr., which straightens them out perfectly.

Fig. 2 shows some carbon steel mattress needles which are handled in a similar manner. The needles are first loaded into the draw loosely and heated to 475 degrees Fahr. Next they are clamped into the fixture in the manner illustrated and drawn at 800 degrees Fahr. which reduces them to the proper hardness and also eliminates all distortion.

Fig. 4 shows two ring gears and two methods of rounding them up in the tempering operation. These gears are SAE-2345 steel. They receive a preliminary draw at 375 degrees Fahr. prior to the final draw at 500 degrees Fahr. in the fixture. The inside fixture, left, consists of a threaded bolt screwed into a section of hexagon stock. After the preliminary draw, the ring is checked for distortion. Then the fixture is inserted

(*Please turn to Page* 140)

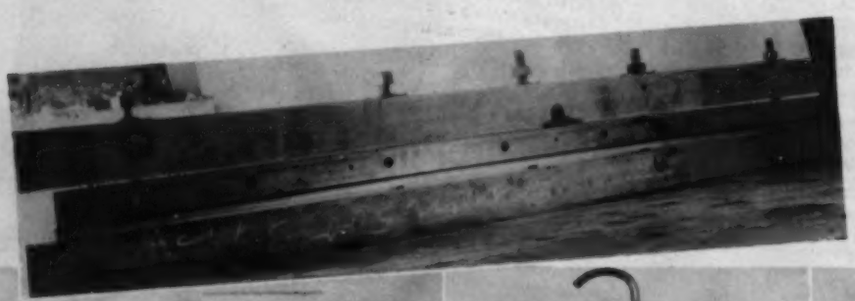


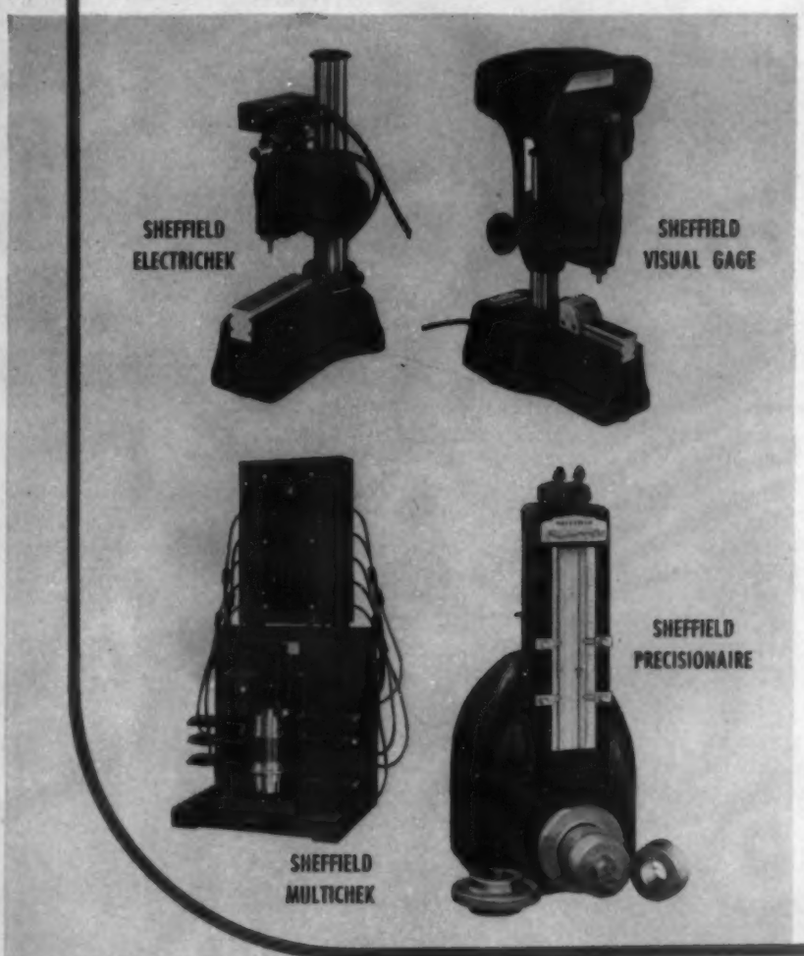
Fig. 1. (*Upper left*)—*Distortion is evident at both ends of this press brake die before the preliminary draw. Straightness tolerances were easily reached by final draw while work was clamped tightly in fixture*

Fig. 2. (*Left, bottom*)—*Carbon steel mattress needles, after a 475-degree Fahr. preliminary draw, are clamped in the fixture shown and draw straightened at 800 degrees*

Fig. 3. (*Center, bottom*)—*Carbon spring steel parts as they come from the oil quench are distorted badly as shown at extreme right. Preliminary draw is given work stacked on center fixture under light pressure from spring. Final draw and straightening operation is done under considerable pressure in fixture at left*

Fig. 4. (*Right, bottom*)—*Here are two clamping methods used in "rounding" ring gears. In foreground is fixture for draw straightening flat sections*

don't let faulty inspection cause you to scrap good parts . . . . .



It has been repeatedly found that close tolerance parts rejected by fixed size gage inspection were quite often within limits when checked on a Visual Gage. In other cases, parts accepted by the fixed size gage are rejected by this more precise gaging instrument. The difference is the human factor—skill—experience—temperament—health.

Sheffield Gaging Instruments remove the human factor and in addition provide greater precision and faster inspection all at lower inspection costs. Write for Bulletin No. 43-1 describing the Visual Gage, the Precisionaire, the Electrichek, and the Multichek.

THE **SHEFFIELD** CORPORATION

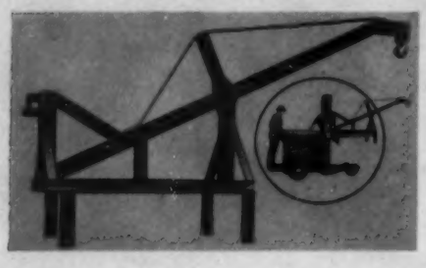
DAYTON, OHIO, U. S. A.

SHEFFIELD GAGES
BETTER GAGEMAKERS

INDUSTRIAL EQUIPMENT

Boom Skid

Palmer-Shile Co., 796 South Harrington street, Detroit, is offering a new boom skid which when mounted on industrial trucks converts them into boom trucks. Applied to either high-lift or



fork trucks, the boom skid is capable of picking up and moving heavy objects of any weight load allowed by the truck balance.

The boom is of fabricated steel; all welded construction. It measures 114 inches long overall, the base being 54 inches, and the boom extending 60 inches beyond the base. It weighs approximately 350 pounds.

Metal Parts Washer

Sturdy-Bilt Equipment Corp., West Allis, Wis., announces a new Simplex metal parts washer designed to replace old complicated time-wasting methods of cleaning, washing and preparation of small metal parts, castings, stampings, etc. Compact, it combines a time proved method with a new simplified action that does a thorough job in much less time.

A correct solution in the tank provides

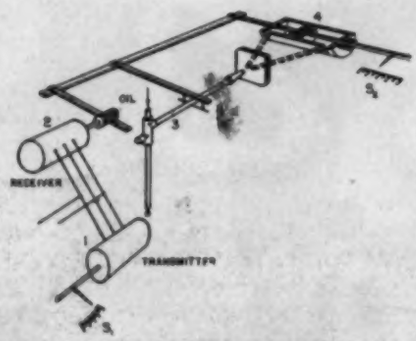
a chemical action during the soak, loosening grease, oil, dirt and foreign metal chips. The "swishing" action into and out of the solution provides a soaking and washing action that positively removes all foreign material.

The tank is fully insulated and cleaning solution is heated to a temperature of 120 to 130 degrees in a short time by means of steam, electricity or gas. An electric motor operates a lever mechanism which lowers and raises the material tray into and out of the soaking tanks. The operator loads the tray, presses a switch and the washer does the rest. The unit is being offered in sizes of 36 x 24 x 36 inches deep (130-gallon capacity); 48 x 36 x 36 inches deep (265-gallon capacity) and 60 x 48 x 36 inches deep (450-gallon capacity).

Remote Control Device

Askania Regulator Co., 1603 South Michigan avenue, Chicago, announces a new remote control device which combines advantages of the jet pipe principle with functions of a Selsyn motor.

With this combination, the company states, the Selsyn movement need merely operate the jet pipe, which is practically frictionless, transmitting the original im-



pulse through a hydraulic system with sufficient power to operate heavy dampers, butterfly valves or any other equipment requiring accurate remote operation.

Diagram illustrates how movement of the Selsyn transmitter, 1, is transmitted to the receiver, 2, which in turn alters the position of the jet pipe, 3, causing a greater hydraulic pressure to result on either side of piston, 4.

According to the company, the amount of movement of the piston is always proportional to the amount of the original motor movement. The cylinder can be used to produce a proportional stroke, force or rate of turn proportional to the displacement of the transmitter, 1. The factor of power, force or amplification is practically unlimited and accuracies of 0.2 per cent are obtained, it is said.

Long Thrust Fastener

Prestole Division, Detroit Harvester Co., Toledo, O., announces the perfection of a special long thrust fastener designed to hold in alignment and in clamping position extraordinary thicknesses of material.

The fastener is a companion tool of the "skin" holder now widely used in "aluminum skin" assembly, and is already

being used by large aircraft manufacturers.

According to the company, the unit solves the problem of providing heavy spring tension necessary to hold sheets tightly together, besides the necessary elements to clear through "thicknesses of metal".

Steel Cartridge Case

Hepburn American Co., 21 East Fortieth street, New York, is now offering in this country a steel cartridge case base finishing machine for cases ranging in size from 37 millimeter upward. It is designed specifically for base finishing operations required on steel cartridge cases. Where necessary, according to the company, it can be used to machine brass cartridge cases until steel ones are in production, with slight alterations.

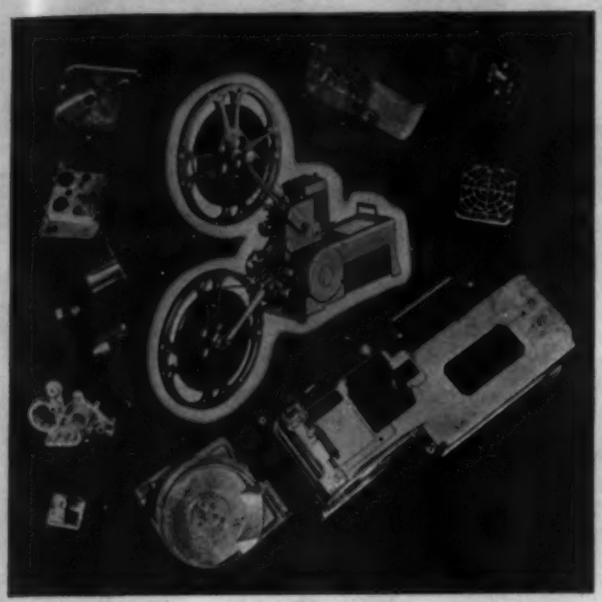
Machine is of direct drive type assur-

ing continuous and positive pressure on the cutting tools. Its system of air-oil feeds permits an infinite variation in the feed and does not put brutal pressure on the tools, it is reported. Oversize Timken precision bearings are used at

(*Please turn to Page* 112)

FOR WAR TODAY—FOR YOUR PRODUCTS TOMORROW

A DIE CAST PROJECTOR FOR SERVICE FILMS



Most of the castings can be identified on the projector

One of the country's leading producers of motion picture equipment is now turning out special sound projectors for the exclusive use of the armed forces. Motion pictures are a "must" in this war for training—and for entertaining—service men. Says the Commanding Officer in Iceland: "Motion pictures are as necessary to the men as rations."

As is evident from the zinc alloy die cast parts grouped around the complete assembly in the above illustration, the new projector is practically all die cast. Here you see the inherent advantages of zinc alloy die castings fully utilized—economy, complexity, accuracy and strength.

This item deserves a place in your post-war product planning file.

HOW WOULD YOU PRODUCE THIS PART?

We would like to be able to place the part illustrated below

One piece construction—front and rear views

THE New Jersey zinc ALLOY POT

FOR VICTORY BUY UNITED STATES WAR SAVINGS BONDS STAMPS

A publication issued for many years by The New Jersey Zinc Company to report on trends and accomplishments in the field of die castings. Title Reg. U. S. Pat. Off.

STEEL MAGAZINE EDITION **No. 9**

in the hands of every design engineer in the country. It is an outstanding example of the ability of the die casting process to produce unusual shapes in one piece—in zinc alloy.

The photograph gives sufficient detail—in lieu of examining the actual part—to ask "How else could it be produced at comparable cost?" As cast in zinc alloy the part is 3¼" in diameter, and weighs 1 lb. 6 oz. Its use?—that's a military secret.

LESS MACHINING WITH DIE CASTINGS

Because of the complexity of form, the accuracy of detail, and the smoothness of surface obtainable in zinc alloy die castings, the parts so produced usually require little or no machining. There are many instances where a simple trimming operation to remove flash metal is all that is necessary to put the castings in service.

When machining is required, however, the free-cutting zinc alloys insure easy, rapid metal removal—with long tool life. For full information on current machining procedure with zinc alloy die castings, write for a copy of the bulletin "Practice In Machining Zinc Alloy Die Castings."

For many applications, only this trimming is necessary

THE NEW JERSEY ZINC COMPANY 160 FRONT ST. NEW YORK CITY

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Presses for BRIQUETTING and BALING Steel Scrap

By W. L. DeLANEY
Baldwin Southwark Division
Baldwin Locomotive Works
Philadelphia

Fig. 1. (Above)—Turnings and samples of finished briquettes

Fig. 2. (Below)—Mechanical type briquetting machine of 300-ton capacity with motor-driven feed hopper (shop view)

AN ADEQUATE scrap supply has been increasingly stressed in view of the depletion of available stocks under unprecedented demand and accelerated production schedules. Under these conditions not only are the normal sources of melting scrap inadequate but also briquetted and baled scrap are in heavy demand. As a means of placing scrap material into forms more easily handled and charged into furnaces, several distinct type of machines including briquetting and bailing presses have been developed to meet the various conditions imposed by the material handled.

Scrap material varies in form and size according to its origin. The heavier material, which may be compacted into bales, may require shearing to size on an alligator or gate shear; light material may be fed directly to the baling press; and turnings and borings, which are briquetted, may be put through a centrifuge to remove oil or cutting compounds and also through a crusher to reduce the turnings to a size which the briquetting mold will accept.

The first type to be considered is the briquetting press for handling turnings as they come from the machine without crushing. The machine designed for this service is of the mechanical type where the power for briquetting is supplied by a motor through a gear train. Scrap in the form of turnings is fed to a hopper of this machine which is provided with a motor-driven breaker and compactor to insure the material will be sufficiently small to enter the compression chamber

How to Repair Valves
Short-Cuts to Faster Piping Jobs
TIPS ON VALVE TRIM
TO HELP KEEP PIPING ON THE JOB
11 SIMPLE WAYS TO GET BETTER SERVICE FROM PIPING EQUIPMENT
HOW TO KEEP YOUR PLANT GOING WITHOUT INTERRUPTION!
HELPFUL HINTS ON CHOOSING VALVES FOR BETTER PIPING SERVICE

He'll Learn Faster From These Practical *"PIPING POINTERS"*

Millions of "green" war workers are willing and ready to learn. But it's up to you and us to give them practical aids for doing a better job.

In hundreds of plants today, training of maintenance crews is being speeded by Crane "Piping Pointers." These bulletins, based on Crane's 88-year experience in the flow control field, are aimed at a single purpose: to keep pipe lines—*your plant's lifelines*—operating at peak efficiency.

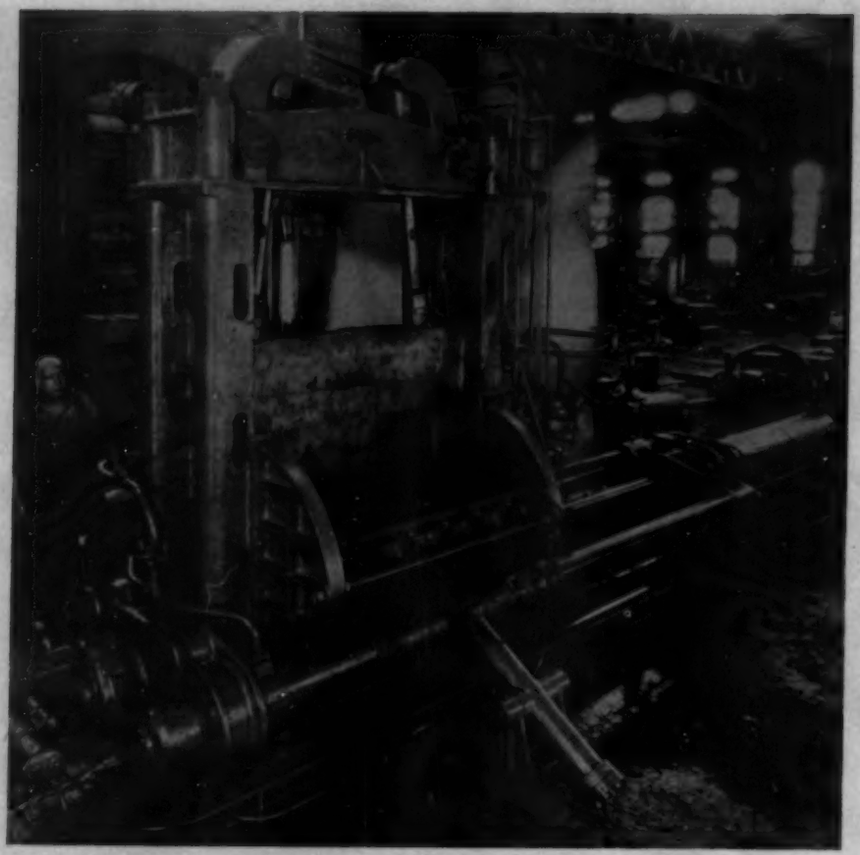
"Piping Pointers" give practical aid to veterans as well as beginners. They're full of *do's and don'ts* and *rights and wrongs* of sound piping practice. They show proper valve selection—installation short-cuts—correct repair procedures—substitutions to solve material shortages—and safety hints. Anyone can understand and use them.

SENT FREE TO ANY PLANT

For Victory's sake, faster training of workers for better maintenance of piping is a vital *must.* In "Piping Pointers," Crane Co. shares its basic information for that use, with all industry, and offers these bulletins free to any plant. Ask your Crane Representative or write direct for your supply. Crane Co., 836 South Michigan Avenue, Chicago, Ill.

ARMY E NAVY

CRANE VALVES



and adequately fill it to form a full briquette.

The die or mold is provided with two opposed plungers. One ram is stationary while the other has a reciprocating motion driven by the crankshaft. The die also moves back and forth over the stationary ram, being actuated by a rocket shaft through a set of toggle links driven from the main gear. The relative movements of the driven plunger and the intermittently moving floating type die allow the charge to be forced from the stationary feeding chamber into the mold, compressed and stripped therefrom. The main crankshaft actuates a crosshead provided with a ram operating in a stationary cylinder. A second ram of equal size in the opposite end actuates a second crosshead carrying the moving briquetting plunger. The two crossheads are connected by pullback rods slidable in one crosshead and the cylinder is connected to an air operated hydropneumatic balancer. This arrangement allows maximum pressure to be maintained on the briquette for a certain angle of main crank revolution, which is essential to care for variations in the material fed to the die. The briquettes formed are approximately 7 inches diameter and 3½ inches high, weighing 22 pounds each, with an output of

(*Please turn to Page* 141)

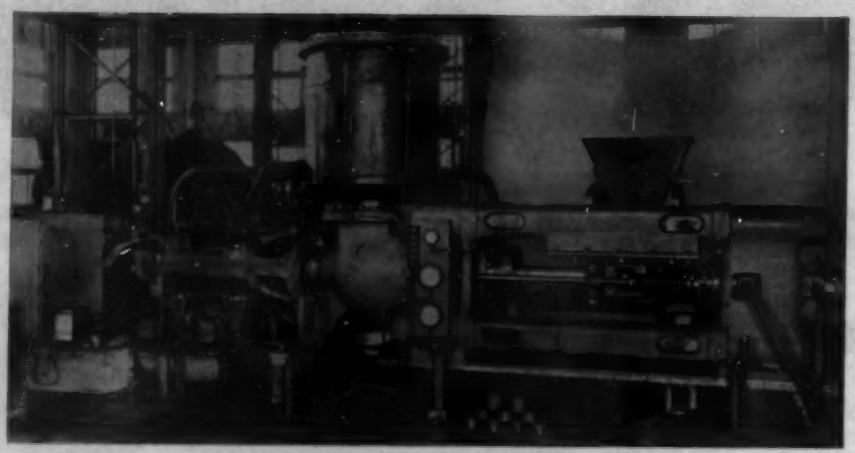


Fig. 3. (*left, above*)—*Continuous baling press for light sheet steel scrap*

Fig. 4. (*Left*)—*High-speed briquetting press of* 450 *tons capacity with self-contained, oil-operated power unit*

Fig. 5. (*left, below*)—*Continuous baling press installation showing scrap charge in press*

Fig. 6. (*Right, below*)—*Type of bales produced on continuous baling press*

(ACME)

USE RACO COMPOSITE TYPE D ELECTRODES

Have you looked into the possibilities of using *Raco Type D* Electrodes instead of shielded arc electrodes?

There are many jobs being done today ... or being held up for lack of shielded arc electrodes ... which could be satisfactorily handled by the use of *Raco Type D* white coated electrodes.

If you are welding mild steel ... for storage tanks, range boilers or products of a similar nature ... or working with galvanized material ... or producing pans or boxes of lighter gauge sheet metal ... take time to look into the availability of *Raco Type D*. The only type electrode readily available that will give results most nearly comparable to Shielded Arc type electrodes.

Many millions of pounds of *Raco Type D* electrodes have been used for automatic and manual welding for the past ten years by the largest automobile plants where high speed is of primary importance.

We can make prompt deliveries of Raco Type D Electrodes. Samples of standard size electrodes will be promptly furnished on request.

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The **REID-AVERY COMPANY**

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Makers of Raco Type HD Shielded Arc Electrodes for Stainless Steel, Mild Steel, Raco Type M and Type D Light Coated Electrodes for Manual and Automatic Work. Samples and Literature on request.

MATERIALS HANDLING FACILITIES PLAY IMPORTANT PART IN . . . .

Segregation and Reclamation

Salvage is big business in many plants. But its success depends largely on efficient segregation and reclamation systems. These in turn depend upon proper mechanical aids to materials handling. Here are some hints on how to organize and conduct such a salvage system effectively, told by a man who has done one of the jobs of this type in the country

By F. E. BLIVEN
Supervisor of Salvage
Erie Works
General Electric Co.

TO TAKE CARE of the need of proper and careful preparation of scrap metals, a *supervisor of salvage* directs this work in each of the General Electric plants. He usually reports to the general superintendent and the works manager. He is generally an engineer with broad factory training. He gives general direction to the collection, preparation and disposition of scrap materials. Too, he operates the extensive facilities which each Works has provided for the centralization and control of scrap accumulations. He also initiates studies leading to the reduction of scrap accruing from machining and assembly operations. Co-operation of this group of supervisors is effected through the Apparatus Manufacturing Department at Schenectady where Harry J. Beattie marshalls the efforts of all the works.

While each industry, factory, locality faces a different set of conditions, certain fundamental principles can be applied to organize the collection of scrap. These essential steps for an efficient salvage department are:

—Selection of Personnel: An able salvage director would be a man of broad experience and understanding—one who commands the respect of the entire foremen group as well as that of his own men. In the interest of clean scrap, it is necessary to acquaint the foreman in the separate manufacturing units with the need of careful segregation in the shop and the best methods of doing it. At least 40 per cent contact time should be devoted to this phase of the job.

—The physical equipment of the salvage department should be devised and selected so as to handle all scrap operations at one point. Bulky materials as produced by some larger shops can be economically placed in saleable shape at the divisional point. Because salvage departments under a sound accounting system will assume the expense of these operations they should give supervision in these separate departments with full sanction of the section superintendent.

—Sufficient ground area in the salvage department is essential to segregate and bin scrap economically, safely and satisfactorily.

—For complete economic handling it is necessary that all salvage departments study their present practices of collection and operation to the degree that they clean house and place such operations on a basis of handling *yesterday's production of scrap* from each separate manufacturing area to the stage of full classification and sorting into saleable scrap *on the following day*. The departments should be manned and tooled accordingly.

—Orderly daily handling is regarded as the best possible means of disposal and segregation of scrap. It operates no backlog and it eliminates the hazard of contaminating scrap items. It enhances scrap value by virtue of producing cleaner scrap. The effect of this good housekeeping is a cleaner salvage department and it brings home to the manufacturing departments the desirability of improving their conditions. At Erie, the foreman of the salvage department is a member of the housekeeping committee selected by the general superintendent and he also acts in an advisory capacity to the housekeeping

From a paper presented at the symposium on secondary metals, American Institute of Mining & Metallurgical Engineers, Feb. 17, 1943, New York.

Left—Material being dumped on floor in front of incinerator for inspection and sorting prior to disposal. Note semitrailer is in a 90-degree angle with the tractor, yet dumping device works smoothly

Above—Salvage department of G-E Erie Works employs this accumulating bin arrangement in its iron and steel scrap yard. View shows 325-foot craneway serviced by 20-ton crane on 75-foot span

committee which is a functional phase of the Foremen's Association.

—**Daily operation** commensurate with the shop production rate will suggest a more frequent sale of scrap, thus providing immediate cash return, a minimum inventory and freeing floor area for other activities.

—**Integrity of the accounting methods** with the view of returning maximum direct credits for scrap from contributing departments is important. The daily processing of yesterday's scrap enables prompt investigation of certain questionable items, and provides reliable data for use by waste and spoilage representatives. Again here we wish to emphasize the importance of educational methods to acquaint all personnel with the *cost value of scrap*, for every piece of scrap due to defective workmanship involves processing expense put into it that may exceed the material cost several times.

—**Broad contacts** should be established with the foundry, works laboratory and engineering departments to foster greater use of home scrap.

—**Salvage supervisors** should interchange data on modifications in market conditions, scrap selling channels, availability of newer outlets.

—**Study of methods of sorting scrap** which would secure the greatest return and an interchange of information between foremen of each manufacturing area should be encouraged.

—**Close contact** with the commercial departments and those responsible for inventory control should be maintained so as to preclude *delayed obsolescence of finished prdoucts* due to heavy inventories in warehouses far beyond the needs of customer protection and service.

—**Educational Responsibility:** It has been found practical to have foremen as well as cost, production, planning and wage payment aids visit the salvage department at intervals of two or four times a year. These scheduled visits have inculcated a keener appreciation of value of scrapped materials. At this point it would be well to emphasize the self sustaining, permanent nature of these programs. All new men, even helpers, should visit the salvage section when first hired to get the complete salvage picture and to learn how their own phase of it fits into that picture.

—**Publicity:** Notices, or the plant newspapers, in larger plants, should be continually used for special articles relating to scrap segregation and interesting notes on operations of the salvage department. It is strongly advocated that the foreman of the salvage department should write a column as this is most helpful from a suggestive and informative point of view.

It is believed that there should be a wider use of the services of the Institute of Scrap Iron and Steel, National Association of Waste Material Dealers. A committee to work and interchange ideas with these trade associations should be appointed to serve as a liason between each plant and these agencies. Representatives of the salvage department should attend all meetings of the foremen groups and activities. Preparation of an occasional talk on scrap for these meetings is a part of the contri-

IT BETTER BE *NEW*— AND *NEWS*

This is new. And it's NEWS for every post-war planner. World's largest fractionating tower. It's all-welded. Sets a NEW high in fit-up tolerances and fractionating efficiency—a NEW low in oil refining cost.

ALTER EGO: Yes—and a NEW high in construction savings. Tower shell costs 30.7% less, weighs 15% less. Trays cost 30% less, weigh 54% less—because of arc welded construction.

That's the post-war pattern! The NEW product must be a better product at less cost. Be it vacuum tower or vacuum cleaner the NEW product must obsolete the old models. Otherwise it's a sales dud.

ALTER EGO: Right! To build metal products that will win post-war sales we've got to think about how WELDING is now building the ADVANCED fighting equipment for winning the war.

That IS something to start this post-war thought: Since we will have to fight WITH or AGAINST new models, let's plan the NEW by finding out from Lincoln what's NEW in arc welding—and how to apply it.

Ask your inner self whether old models will SELL after the war.

THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO

then I said to myself—

WELDING IS THE TOWER IN POST-WAR DESIGNS

Note materials handling aids in this effective setup for cutting up crates and lumber not suitable for re-use in the factory to make kindling. Conveyor from saw facilitates loading boxes of wood onto trucks

bution expected of the salvage division.

—War Production Board: Much laudable and useful information has been furnished by WPB in the many directives controlling scrap materials. The meticulous completeness with which each subject has been treated presents a recording of each activity which has been long needed.

Supplemented with the paralleling OPA pricing schedules, these leave little excuse for inattention to careful preparation and segregation of the scrap. Material data for the first time has been provided for all manufacturers, large or small. Certainly, this is a tremendous contribution to the war effort.

A question may be asked as to the type of men employed in the Salvage Department. We have with rare exception hired men with less than a high school education.

Salvage at General Electric is a big activity, amounting to $7,000,000 yearly and producing 383,000,000 pounds of scrap for re-use every year. This equals 3500 pounds of scrap per hourly rated employe per year. To move this material requires 14 carloads daily.

Segregation is the key to any successful salvage operation. A few illustrations of the approach to this task at GE's Erie works follow:

Steel Plate Fabrication: Last year several hundred locomotives—mainly diesel electric and mining locomotives—were shipped out from Erie. Completely manufactured at Erie, these locomotives included electrical control and motors. Much steel plate up to 6 inches in thickness is fabricated into motor frames, floor plates, side frames and parts of the locomotives by torch cutting. The utilization is good, for shop forces and engineers have co-ordinated the use of the cut-outs to avoid waste.

Yet in 1942 we produced 3751 net tons of low phosphorus scrap—70 per cent of which was loaded for the foundry and forge furnaces in Erie. Each 65 tons accumulated was loaded at night and generally consumed in the week shipped. Some 30 per cent was used in the malleable foundry within the plant as a *substitute for steel rail.* Initiated in June, 1941, this saved the use of 1149 net tons of steel rail that year. Here is the case for clean scrap and its immediate re-use. In malleable practice, we fear chromium. General Electric specifications for boiler plate or welding plate do not anticipate any chromium. Occasionally chromium (0.08 per cent) develops.

Fortunately most plate or slab is free from this metal. We have not had any accumulative effect affecting the hand iron or sprue scrap. This year we will increase the foundry use for plate and again reduce the demand for steel rail.

Burning Slag: An interesting by-product of the burning out of plate and welding is the accumulation of slag. We shipped 800,000 pounds to a local blast furnace—11.4 per cent of total material cut to the requisite shape. This is an excellent filler steel for a blast furnace running tonnage.

Conservation of Welding Electrode: Intimately connected with the fabrication of motor frames and locomotives is the conservation of welding rod. The largest factor of waste is stub-end scrap from the stick electrode. Instructions to the stockkeepers prohibit acceptance of stubs greater than 2 inches. The welding operator is provided with a box to contain both the new electrodes and the stub ends. New electrodes are furnished only when the stubs from the used electrodes are returned to the stockkeeper.

Theoretic loss is 11.1 per cent for the 18-inch rods and 14.3 per cent for the 14-inch rods. As accurately as we can determine, we cut our over-all loss to about 13.8 per cent during the past six months.

The stockkeepers segregate the scrap carbon rods, carbon moly, stainless rods and other alloyed stock. Instruction charts for rod segregation are posted in all booths.

Machine Shop Steel Turnings: Few problems relating to the collection of scrap give ground for wider difference in opinion in methods of handling than steel turnings. Our tool designers and the machine operator work assiduously to produce turnings in which the chips are shorter than 8 inches in length and thus more easily collected.

Cutting the deep slots of turbine rotor shafts is one of the toughest jobs we have at Erie. The slots are close together and narrow. The cutting tools are very expensive and sufficient stiffness cannot always be designed into the tool. Further, it is necessary to protect against injury to the tool from the chip. The chip must have clearance to prevent jamming. We also appreciate that the chip is from tough steel. Turnings waste last year was 50 per cent of our total steel scrap. The normal run of machine shop turnings was accumulated from 15 departments at the rate of 52,000 pounds a day.

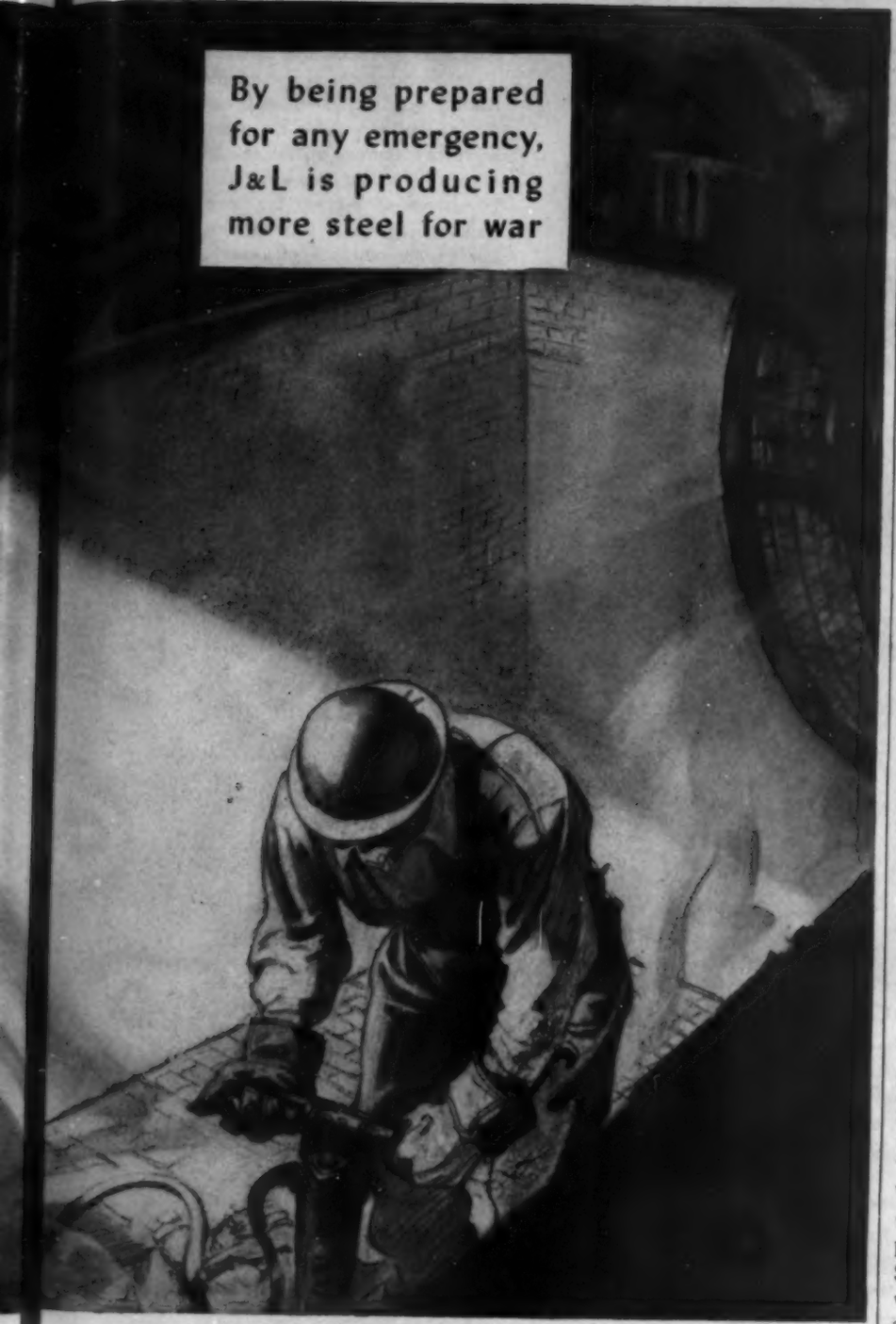
Alloyed Steel Turnings: Most vital, however, was the necessity of providing scrap from strategic alloyed steel materials that was uncontaminated and would comply with the requirements of *Price Schedule No.* 8 for nickel and alloy bearing steels and supplementary orders

(*Please turn to Page* 123)

COPYRIGHT 1943 — JONES & LAUGHLIN STEEL CORPORATION

MAINTENANCE MEN HELP SPEED WAR-STEEL PRODUCTION

Crews of maintenance men on the steel front, made up of skilled workers of practically every trade and craft, are keeping all required facilities on the job producing steel for war. Employing every precaution for safety in getting at hot furnace repair jobs quicker, and getting them done faster (illustration shows crew reconditioning soaking pit furnace bottom), these men work in short relays and use powerful airplane-propeller fans to supply them with fresh, cooling air. Maintenance supervisors have their fingers on the pulse of every furnace, mill and machine



FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

in the works. They have tools and replacement parts ready at hand for the emergency when it occurs.

The 650,000 workers in America's steel industry are making the most of every minute to push past their present high rate of production — 85 million tons of steel a year — every ton of it steel to provide our fighting men with equipment, arms and ammunition to crush enemy forces and protect our own.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PENNSYLVANIA
CONTROLLED QUALITY STEEL FOR WAR

J&L STEEL

CRAFTSMANSHIP

Craftsmen from practically every trade are employed by the steel industry in maintenance and construction work. Bricklayers, boiler makers, carpenters, electricians, pattern makers, pipe fitters, painters, welders, riggers, machinists, millwrights — to name but a few — make up the more than thirty different crafts in steel works.

Steel operations above 100% are partially explained by the fact that ingot capacities are based on expected performances after making allowances for operating time lost account of necessary rebuilding and relining of furnaces as well as other essential repairs. When the United States entered the war, the steel industry, employees and management, began to devise every conceivable means to increase production time including the shortening of rebuilding and repair time. The time allowance for rebuilding and repairs has actually been reduced considerably, permitting an increase in operating time, partially accounting for the seemingly anomalous operating rates in excess of 100%. As an example, J&L average operating rate for the year 1942 was 103% of capacity.

World's worst road being constructed on contract from War Department by a Baltimore contractor is to be maintained in "most atrocious" condition. The specifications call for simulated shell holes, gaps, dizzy inclines and stretches of broken roadway under water. It is being built at Aberdeen Proving Grounds for field testing Army motorized weapons.

Electricity from amber. Some 600 years before Christ, a wise Greek named Thales discovered that amber (*Elektron* in his language), after rubbing, would attract various light-weight objects. In the 16th century Sir Humphrey Gilbert named this mysterious force *vis electrica*. Walter Charleton called it "electricity" in 1650.

World of electronics has developed a device that rolls over railroad tracks and sprays white paint on rails if unseen defects are located.

Sporting arms and ammunition, after the war, will show some startling improvements, experts predict, that will delight sportsmen and women who like to shoot for game in field and forest or at targets. War-time application of steel for ammunition casings and for jackets (gilded or plain) of all calibers of bullets in order to conserve critical metals, will carry over into field and range at war's end. New firearms for sporting use will likewise come out of the war, due to newer, better steels and the invention of faster, more accurate weapons for our fighting men. With thousands of American sportsmen now selling their shotguns and other weapons to the Federal government for use in guarding war plants, there will be brisk demand for new firearms after the war.

If you ask to see the "boss" on board ship, a sailor will show you the curved portion of the hull around the propeller shaft.

LESS CARE with CAREY

● Ask any power engineer why he likes Carey Insulations . . . any owner of a Carey Roof why he favors this particular roof . . . any user of other Carey Products what he thinks of them . . . the answer is—"DEPENDABILITY."

● "Dependable Products since 1873" represents much more than a slogan. It is proof of long experience—an evidence of scientific research—an assurance of high quality.

● The result is that Carey Products stand up to the conditions for which they were made. They are dependable in service, economical in cost, reduce maintenance and deliver plus values. Industry uses them with confidence. If your needs include products of Asphalt, Asbestos and Magnesia it will be to your advantage to consult a Carey representative. A nationwide organization is ready to serve you. Write our nearest Branch Office or address Dept. 71

USE MORE Carey PRODUCTS

Roofings, Roof Coatings, Fireproof Sidings, Flooring, Wallboard, Ducts for Heating and Air Conditioning Systems, Waterproofing Materials, Asbestos Paper and Millboard, Asbestos Sweeping Compound, and many other products of ASPHALT, ASBESTOS and MAGNESIA.

THE PHILIP CAREY MFG. COMPANY
Dependable Products Since 1873
LOCKLAND, CINCINNATI, OHIO
In Canada: The Philip Carey Company, Ltd., Office and Factory: Lennoxville, P. Q.

(*Continued from Page* 100)

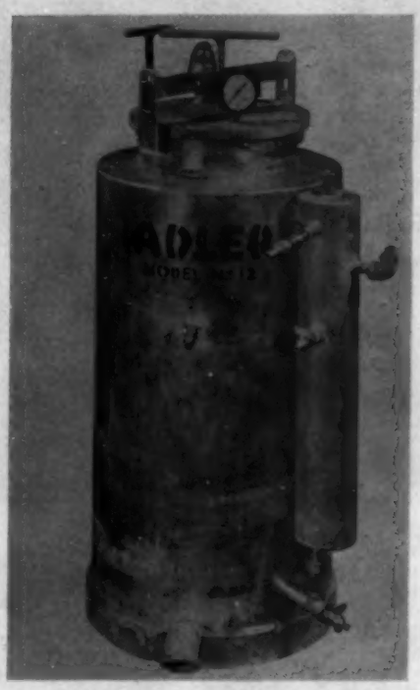
all major points on the machine.

Another feature is the Duplex breech loading position. Both stations are readily accessible and the operator can serve two stations on the machine simultaneously. The machine as originally purchased is set up for a given size cartridge case. It can be converted for use in manufacture of other size cases within the size range limits by changing pulleys, collets, tools, etc.

The unit is offered in three sizes. Size A is for base finishing operations on cases from 37 to 75 millimeter inclusive, size B for 90 to 105 millimeter and size C for larger cases. The size C machine is not supplied with the duplex breech loading feature due to handling considerations. The base finishing machine comes in two different types, the difference being the sequence of the operation cycle, that is, the number of tool positions used in machining the base end.

Acetylene Generator

Adler Mfg. Co., 1440 North Fourth street, Milwaukee, offers for the first time in the United States a portable high-



pressure acetylene generator for use with welding, cutting, soldering or brazing operations.

A European development, the unit is easy to operate. It produces a constant even pressure and resultant quality flame. Absolute automatic control is obtained through the displacement method. Instead of the old fashioned method of feeding rice carbide into the water,

ILLINOIS TOOL *Milling*

where DESIGN and PRECISION combine to create better tools!

In making an efficient cutting tool, whether it be a hob, broach or cutter, the milling operation is of extreme importance. Precise and skillful craftsmanship is required to produce the tool exactly as designed. This is particularly true when special construction features are incorporated.

The illustration above shows an Illinite Slab Milling Cutter being milled with extra large fillets designed to follow the natural chip curvature for maximum removal of material. This is typical of the special construction provided in Illinite cutters to achieve utmost efficiency in accordance with the specific purpose of the tool.

Discuss your tool design problems with an Illinois Tool engineer—his suggestion will point the way to increased production through greater tool efficiency.

OVERNIGHT TO ALL AMERICA . . . FROM THE HUB OF AIR TRANSPORTATION

ILLINOIS TOOL WORKS

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS
2501 N. Keeler Avenue, Chicago, Illinois
In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

ILLINITE HOBS • BROACHES • SHAPER CUTTERS • GEAR CUTTERS
MILLING CUTTERS • GROUND FORM TOOLS • SPECIAL TOOLS

. . . AND SPOIL THE CHILD IS AN OLD AXIOM

Sell a Customer a Tool Welding Rod Without Proper Engineering and Supervision and You Spoil the Job

There is only one SUTTONIZING welding process for the reclamation of hi-speed steel cutting tools. Imitators who attempt to follow in the footsteps of the long tried and true SUTTONIZING practice, find the going extremely *tough.*

Let us elaborate: First of all, any material sold for hi-speed tool repair in your shop is usually doomed to failure, principally because the user cannot pass through the rigorous experimental stages that the Welding Equipment & Supply Company have. The Welding Equipment & Supply Company are *positively* the indisputable *originators* of this process. Then too, the lamentable fact remains that the seller of any rods purporting to work as well as SUTTONIZING must fail because that vendor would not have the engineering talent at hand to properly institute this work in any welding department.

As a matter of fact, we have tried and miserably failed in most instances to achieve satisfactory results except *in our own plant* under the keen and painstaking scrutiny of our engineers, using only skilled operators, well seasoned in this delicate welding process.

For complete details on SUTTONIZING write or wire us today.

WELDING EQUIPMENT & SUPPLY CO.
220 LEIB ST. **DETROIT, MICH.**

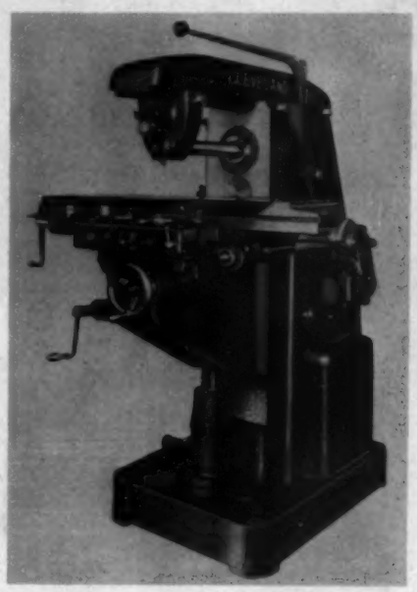
the Alder system immerses the carbide totally in the water, and the resultant acetylene gas pressure forces the water into the outer chamber. This immediately stops the further development of acetylene until the developed gas has been used.

"Lump" carbide only is required for the unit. Its automatic control feature eliminates hand operations of pressure and safety valves.

Milling Machine

Sommer & Adams Co., 18511 Euclid avenue, Cleveland, announces a Cleveland No. 1½ horizontal production milling machine which can be set up easily for both long and short runs. Its table can be set for full automatic cycle, giving rapid approach and feed, and rapid return from either direction continuously or can be arranged to stop at end of cycle.

The machine has a multiple V-belt drive motor. This is fully enclosed and



located in the base of the column. Eight standard spindle speeds are developed by means of pick-off gears and back gear, ranging from 50 through 1000 revolutions per minute. Fifteen standard feeds, ranging from ½ to 18 inches per minute, are furnished to the longitudinal table feed.

Other features include an automatic spindle brake, one-piece column, wide knee bearings, rigid construction throughout, all gears heat-treated and shaved, self-oiling outboard support, housed electric panel, 10½ x 42-inch table.

Vernier Height Gage

Jansson Gage Co., Detroit, is offering a new vernier height gage for use in

Are You Making Him Wait?
When you ruin a tool,
you may postpone the day
of deliverance for the boys of Bataan!
THERE IS ONLY SO MUCH TOOL STEEL AVAILABLE!

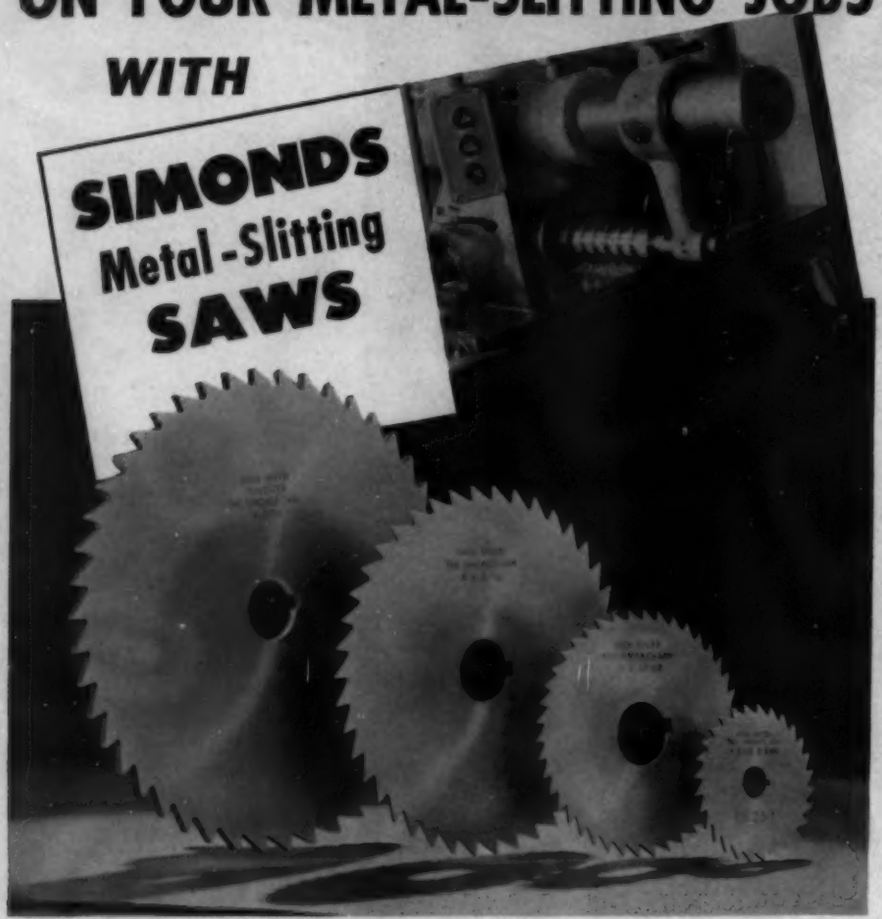
No. 2 in a series of 2⅓ by 3½ ft. 3-color bi-monthly posters, designed to help reduce tool breakage through worker education, made available to users of **"TOMAHAWK"** tools, without charge.

For complete information
wire or write

GENESEE TOOL COMPANY
FENTON, MICHIGAN

® Registered Trade Mark

GANG UP
ON YOUR METAL-SLITTING JOBS
WITH



On gang-milling applications, Simonds Metal-Slitting Saws consistently produce correct slot-widths and spacings. That's because they're made of Simonds Electric Furnace Steel . . . specially heat-treated . . . radially ground to give perfect clearance . . . and individually inspected for complete compliance with Simonds specifications, which guarantee faster, longer cutting. Sizes from 2½" to 8" diameter. Standard thicknesses. Quick delivery of standard sizes on rated orders.

SIMONDS SAW AND STEEL COMPANY

1350 Columbia Road, Boston • 127 So. Green St., Chicago • 228 First St., San Francisco • 520 First Ave., So., Seattle • 311 S. W. First Ave., Portland, Ore.

SIMONDS

Famous Family of Metal-Cutting Tools

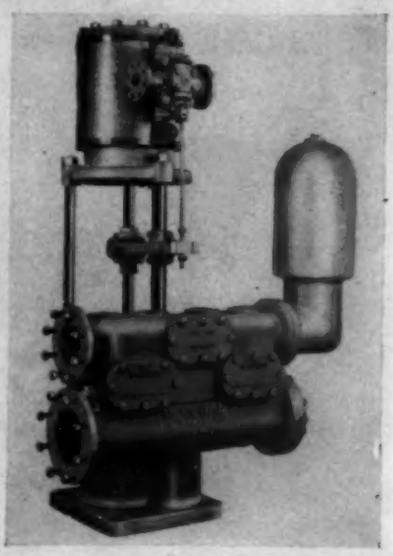
★ BOUGHT YOUR BONDS THIS WEEK? ★

jig and fixture making and for general layout and inspection work. It is being manufactured in three standard sizes—12, 18 and 24 inches, English or metric measure.

According to the company, exceptional precision enters into their calibration, making the gages valuable adjuncts to gage blocks in angle measurement, and other operations where unusual accuracy is required.

Vertical Marine Pump

McGowan Pump Division, Leyman Mfg. Corp., 15 Central avenue, Cincinnati, announces a new vertical marine pump designed for shipboard services. The liquid end of either cast iron, steel or bronze is trimmed to suit

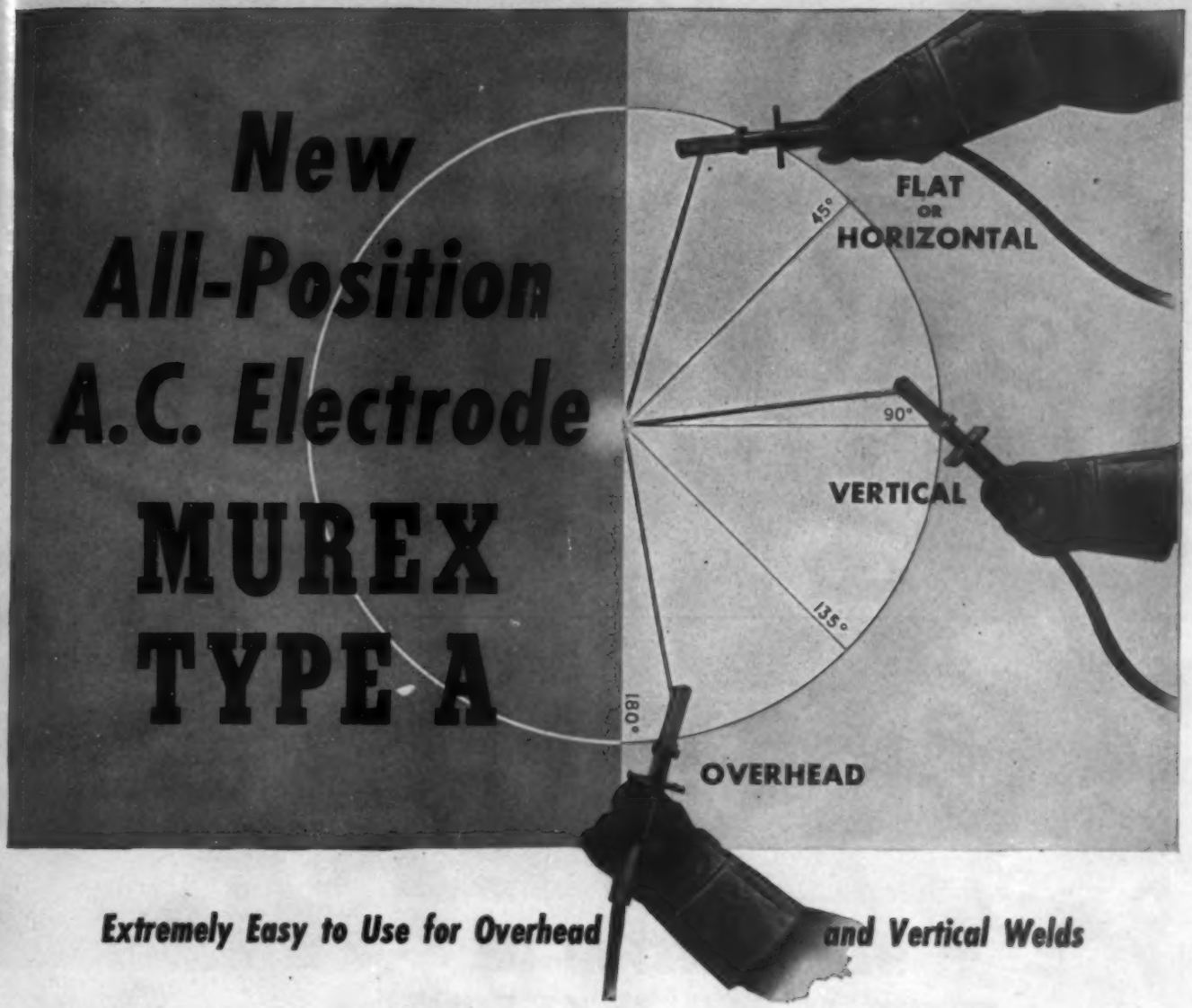


service conditions. According to the company, the entire pump can be opened without disturbing the piping or moving the pump off its foundation. Piston and liners can be easily inspected and the design allows easy maintenance.

Hole Punching Unit

Strippit Corp., 345 Payne avenue, North Tonawanda, N. Y., is offering a new type E hole punching unit for punching extruded shapes and sections. It is designed for punching a series of holes simultaneously in shapes on press brakes. Its center projection carrying die member, extends into all shapes of extruded work and provides clearance for the legs in lower gap. Work slides easily and quickly into level position on top of the die where it is pierced by the punch.

Each unit is made up of punch, die, holder, stripping spring and guide. The punch and die are held permanently in alignment. Units of this type provide unlimited scattered and straight line pat-



Extremely Easy to Use for Overhead and Vertical Welds

Operators will like this new Murex Type A electrode because it is so easy to handle—in vertical and overhead positions as well as flat and horizontal. The molten pool is easy to control, and the slag easy to remove. Strong, uniform welds having complete fusion and good penetration are produced with characteristic A.C. speed and economy. X-Ray photographs show clean weld metal without gas or slag inclusions. Welds are smooth with no undercutting. ¶ Murex Type A electrodes meet the requirements for Grade E-6011 electrodes under A.W.S.-A.S.T.M. specification A-233-42T; for grade III, classes 1 and 2 under U. S. Navy Bureau of Ships Specification 46E3; and for grades H1G, B1G, and E1G, American Bureau of Shipping. ¶ Type A is available in 3/32", 1/8", 5/32" and 3/16" sizes. Typical physical properties of the weld metal, as welded, include yield points of 52,000 to 61,000 lbs. p.s.i., ultimate strengths of 62,000 to 71,000 lbs. p.s.i., and elongations of 22% to 26% in two inches. Type A is also usable on direct current, reverse or straight polarity.

New Murex Catalogue just printed. Contains complete descriptions of Murex electrodes. Send for your copy.

METAL & THERMIT CORPORATION

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

MUREX ELECTRODES

120 BROADWAY, NEW YORK

ALBANY • CHICAGO • PITTSBURGH
SO. SAN FRANCISCO • TORONTO

AMERICAN AAF AIR FILTERS

WAR ON DUST AT THE FRONT—AS WELL AS AT HOME

On every front line airport, as in every war industry at home, the daily battle against dust never stops.

In Tunisia, on Guadalcanal—wherever our war planes operate, airplane motors not protected from dust by air filters require overhauling and rebuilding after only 20 to 30 hours flying time. When equipped with AAF filters which remove 90% to 99% of the dust from the intake air, engines perform efficiently from 300 to 400 hours!

On the home front is an equally vexatious problem. Costly machinery must be protected against excessive wear—materials in process must not be spoiled, and worker efficiency must be maintained. Until the advent of war, the control of industrial atmospheric and process dusts was considered desirable but not vital. But war has changed many things, and today, dust engineering has assumed its rightful place as an essential part of production planning.

If you have a troublesome or dangerous dust condition in your plant, write us about your problem. Send for "AAF In Industry", a new booklet describing the complete line of AAF equipment.

AMERICAN AAF AIR FILTERS

AMERICAN AIR FILTER CO., INC.
INCORPORATED
443 CENTRAL AVENUE LOUISVILLE, KENTUCKY
IN CANADA: DARLING BROS., LTD., MONTREAL, P. Q.

terns by making it possible to quickly reset or remove them from press brake rail. This flexibility of positioning also makes possible using a templet as a guide for still quicker pattern set-ups. Unit is locked into position on rail by a bolt.

Spring Tester

P. A. Sturtevant Co., Addison, Ill., announces a new tool for testing compression springs in sizes to 2½ inches diameter and 7 inches in length. It not only makes it possible to measure rapidly the recoil pressure of a spring when compressed to any predetermined length, but makes it possible to accurately match sets of springs.

The spring tester differs radically from previous testers in the following ways: First, it is operated with any accurate

standard torque wrench, the torque wrench not only serving as the operating lever, but also providing the measuring element. Second, in this tester a sound device is used to indicate when the spring has been compressed to the test point. Third, compression of spring is against a rigid platform to prevent accumulated errors in reading. Fourth, being a lever-operated, quick action device that bolts to any bench, it permits general distribution to logical test, check-up and inspection points throughout a plant.

Operation of the tester is simple. It is adjusted for any test by merely regulating the height of the test platform to match the length at which the spring is to be tested.

The platform is mounted on a threaded column and is raised or lowered by revolving. A milled flat on the column carries a stamped scale calibrated to sixteenths of an inch. Adjustments to 1/16-inch of platform height for test lengths can be read directly on this scale. For finer adjustments one quarter turn of the platform raises or lowers

Rugged American trucks are following the advance of American Armies in the Mediterranean and the Pacific . . . maintaining an ever-flowing stream of a thousand and one vital "articles of war." They're hauling supplies for the Russians —and they're busy readying bases all over the world for the big push that will seal the doom of the Axis.

These Army trucks are *tough*. They're built to go anywhere and everywhere, road or no road. One of our war jobs here at Standard Tube is to make the steering columns that go into these heavy-duty units. We're building them with an eye to the beating they must take. We're employing experience gained in many years of WELDED STEEL TUBING manufacture to give these important assemblies ability to stand up under every operating condition.

We're working round-the-clock on production of WELDED STEEL TUBING and Steel Forgings for a host of other war uses. We can still handle more. We want to handle more. If you have a production problem in either of these classifications, maybe we can help. Drop us a line or pick up your telephone and let us tell you.

THE STANDARD TUBE CO.

Detroit STANCO Michigan

Welded Tubing *Steel Forgings*

★ *Complete Tube Stocks Maintained by* ★

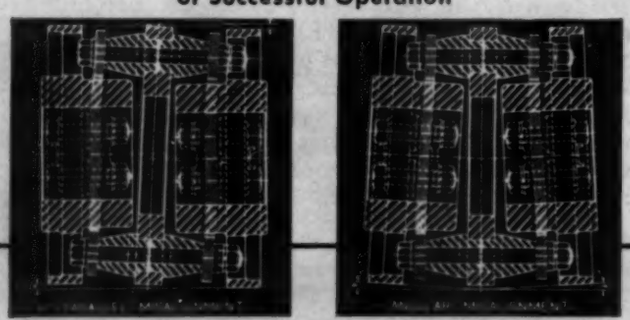
STANDARD TUBE SALES CORP., One Admiral Ave., Maspeth, L. I., N. Y.
LAPHAM-HICKEY COMPANY, 3333 West 47th Place, Chicago, Ill.
UNION HARDWARE & METAL CO., 411 East First Street, Los Angeles, Calif.

NO BACKLASH, NO LUBRICATION, NO WEAR

ONLY THOMAS COUPLINGS HAVE THESE ESSENTIAL FEATURES

Thomas Flexible Couplings make permanent, trouble-free installations. They transmit power without backlash while at the same time they compensate for parallel or angular misalignment. Fatigue which wrecks the very vitals of connected mechanisms is thus eliminated. Better yet, these all metal couplings do not cause stresses, cross pull, or thrust on the bearings. Best of all, Thomas Couplings will last a lifetime without breakdowns which cause time-out periods and maintenance costs. And, remember, please, no other style, type, or design of couplings have these FIVE VITAL FEATURES, all of which are necessary for a permanent, care-free installation. Write for new catalog.

Here's the THOMAS Principle Proven by 29 Years of Successful Operation



5 ADVANTAGES

1. They eliminate backlash entirely.
2. They require no lubrication which collects harmful grit.
3. They are free from wearing parts which cause breakdowns.
4. They have fixed torsional rigidity.
5. They eliminate all end-thrust.

THOMAS

THOMAS FLEXIBLE COUPLING CO.

WARREN • PENNA.

it 1/64-inch—the surface of the platform being marked for readings of 1/64, 1/32, and 3/64-inch. For even finer adjustments the periphery of the platform is divided into 21 ridges—these permit adjustments of test lengths to 0.003-inch.

Protective Jacket

Metal Textile Corp., Orange, N. J., is now offering a new shape-conforming protective jacket or boot for protecting super-finish and fragile parts in process through factories and packing for shipment.

Referred to as the Metex protective boot, it is made with an outside sleeve of composite steel and cotton mesh with

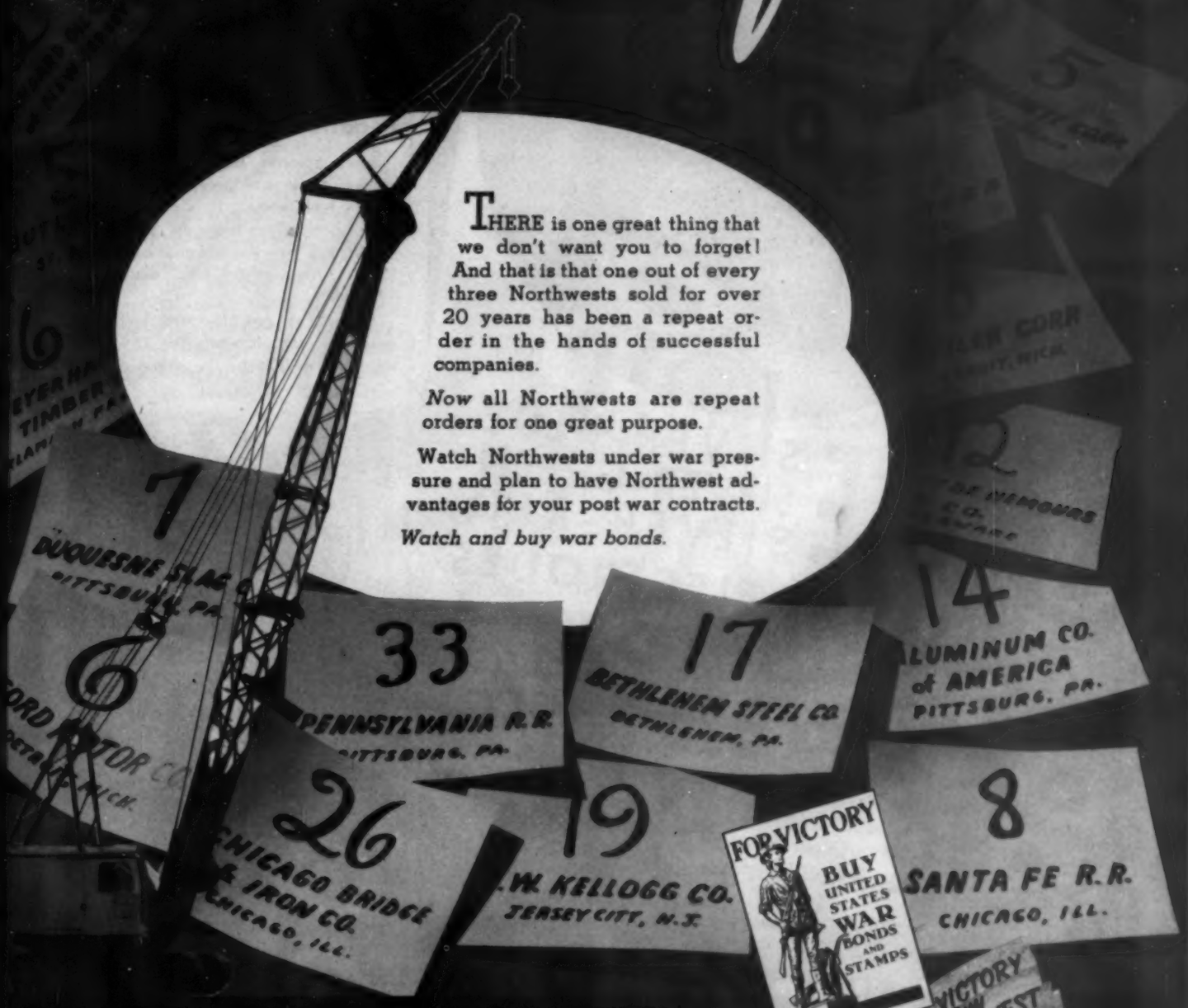
an interlining of all cotton mesh. These combined, it is reported, protect parts from metal-to-metal contact, retain the oil film and exclude dust and foreign matter which causes scratches.

According to the manufacturer, the boots will conform closely and cling to the contour of the parts. They can be applied on parts heretofore wrapped or taped, with one simple quick operation.

Arbor Presses

Lempco Products Inc., 5682 Dunham road, Bedford, O., is offering new 2 and 3-ton bench type arbor presses efficient for assembling, disassembling, bending, straightening and operations requiring up to 3 tons pressure. They feature a snap ball check which permits ram to be "spun" down to work quickly. A

Something to remember for the future!



THERE is one great thing that we don't want you to forget! And that is that one out of every three Northwests sold for over 20 years has been a repeat order in the hands of successful companies.

Now all Northwests are repeat orders for one great purpose.

Watch Northwests under war pressure and plan to have Northwest advantages for your post war contracts.

Watch and buy war bonds.

NORTHWEST

THE CRANE THAT GOES ANYPLACE

NORTHWEST ENGINEERING CO.
1805 Steger Building
28 East Jackson Blvd.
Chicago, Illinois

BUILD *New* DIES
REPAIR *Worn* DIES *with*

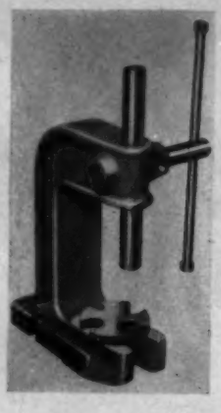
AGILE SILVER-BLUE
SILVER-GREEN
SILVER-RED
WELDING ELECTRODES

are the last word for the repairing of worn or broken dies. They perform equally well in the construction of new dies. The weld metal deposited by these electrodes compares with the best non-deforming, high-speed chisel steels. Simply apply with ordinary welding technique. These electrodes are not the ordinary hard surfacing type. Write for full particulars today. The information you will receive will show you how to speed up production.

AGILE ACTARC

AMERICAN AGILE *Corporation*
5800 HOUGH AVE · · CLEVELAND, O.

large machined table surface provides ample opening and support on each unit—taking work up to 14 inches in

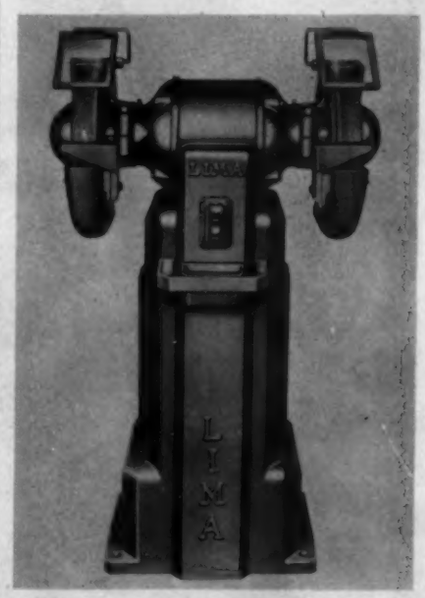


diameter. Machined bearings reduce friction to prevent wear on moving parts.

Pedestal Grinder

Lima Electric Motor Co., Lima, O., announces a new pedestal grinder for use in tool rooms. It is designed as a 2 or 3-horsepower unit. In either model —24S or 25S— the wheel size is 12 x 2 inches with a wheel arbor diameter of 1¼ inches.

Model 24S provides 20¼ inches between the wheels while the 25S allows 24. The height to the arbor on both



models is 39 inches, while the overall height is 45¾ inches.

Other features are: Totally enclosed motor, push-button motor control with overload protection, dust-tight heavy duty ball bearings, improved safety wheel guards, adjustable tool rest and combination lift out water pot and tool tray. The wheel guards also are equipped with exhaust vents.

Reclamation

(*Concluded from Page 109*)

M21 and *M24* which required segregation of alloyed scrap.

Segregation requirements were met fully at the start of the job in the three large production shops. Here it was possible to bank machines using the same steels.

On the other hand, in the sections where only limited quantities of alloys were run along with the ordinary carbon machine steel, special precautions had to be taken to insure clean scrap.

Yet seldom do these alloyed turnings become mixed with the machine shop turnings. This past year we shipped, without rejection, some 2,500,000 pounds of 11½ to 13 per cent chromium bearing turnings and 2,500,000 pounds of 3½ per cent nickel steel turnings, all subject to acceptance on assay.

Incidentally, the so-termed 3½ per cent nickel turnings yield between 2.6 and 2.8 per cent nickel, indicating that full conservation of nickel has been observed by the steelmaker producing this steel and that he has heat treated his material to meet physical property requirements. On some special jobs such as the machining of carbon molybdenum plates we also have been able to separate these particularly bulky type of turnings and secure full advantage of the *molybdenum premium*. This year we estimate that we will save 36 tons of nickel and 132 tons of chromium value in alloy turnings. As you realize, this saves appreciable cargo space for chrome ore from Turkey or freight transportation for nickel from the refiners in Canada.

High-Speed Steel: There are two main classes of high-speed steel—commercial molybdenum steel and the high-tungsten steels. Payment for scrap is dependent upon each per cent of contained tungsten and each per cent of contained molybdenum with a variance depending upon the percentage and whether it is solids or turnings scrap. Straight high-speed steels pay only for the contained tungsten.

We have managed by educational methods and information which goes back to the machine operator to accumulate carefully segregated scrap in both forms. It is our practice to return expended high-speed tools to a central tool department from the divisional tool rooms. The material is examined for possible re-use, spark tested and forwarded to the Salvage Department if scrapped. We recheck both solids and turnings by sparking and sell direct to producing mills, pending assay.

(*Concluded Next Week*)

RESCUED

The need for useful tools was never so great. Since you cannot, in many cases, purchase new products — you must conserve what you have. This book tells you how! Shortages of materials and labor mean that we must rely, as never before, on our tools and our own mechanical ingenuity.

Covered with dust and rust in the cellars, workshops and factories of America lie millions of dollars worth of potentially useful tools. Most of these could be repaired for a fraction of their original cost.

Individually and collectively, let's put these millions of dollars worth of discarded tools back to work. Prompt action is imperative. Delay now means costly deprivement later.

* * * * * *

H. K. PORTER, INC., manufacturers of metal cutting tools since 1880, offer a practical booklet on the use, maintenance and repair of Porter HKP Cutters and other types of small tools. Send for your copy now. All Porter tools are precision built and like parts are interchangeable.

Army-Navy "E" awarded to our Men and Women for Excellence in War Production.

H. K. PORTER, INC.

401 Ashland St., Everett, Mass.

Without cost or obligation send me your booklet on the use, maintenance and repair of Porter HKP Cutters.

NAME .....

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FLEXPEDITE

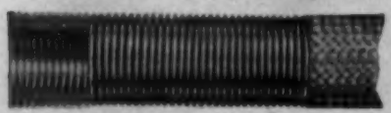
Your Conversion—Assembly—Production

with

REX-WELD

Flexible Metal Hose

Rex-Weld Hose—Annular Corrugations



RW-80 Unbraided ——— RW-81 Braided

Rex-Weld Hose—Helical Corrugations

RW-90 Unbraided ——— RW-91 Braided

General Data

	STEEL	BRONZE
Sizes	To 4" I.D.	To 4" I.D.
Pressures	To 14,500 p.s.i.	To 14,500 p.s.i.
Temperatures	To 1000° F	To 450° F.
Lengths	To 50′	To 50′

Use Chart

	*STEEL	BRONZE
Saturated Steam		✓
Superheated Steam	✓	
Sulphur Bearing Oil	✓	
Oxygen		✓
Ammonia	✓	
Carbon Dioxide	✓	
Sulphur Bearing Grease	✓	
Critical Vibration		✓
Non-Sparking		✓

*Protective Coatings Can Be Applied for Corrosion Protection (To Conserve Critical Copper Bearing Alloys).

Couplings: REX-TITE Mechanical (Re-attachable) Couplings; Solder Couplings; Brazed and Welded Couplings and Flange Assemblies for Rex-Weld Flexible Metal Hose.

Ask for Engineering Recommendations

CHICAGO METAL HOSE CORPORATION

General Offices: MAYWOOD, ILLINOIS

Factories: Maywood and Elgin, Ill.

British Progress

(*Continued from Page* 91)

quired from all applicants.

Shop boys have been successfully upgraded to pupil, as well as trade apprenticeships.

Among the apprentices tested, the boys showing the most fatigue were boys who, the tests indicated, were unsuitable for engineering occupations.

Time lost has diminished very considerably, and the interest and "aliveness" shown generally by the apprentices has improved out of all recognition.

The aptitude tests also forecast proficiency in draftmanship to a high order of accuracy, and could undoubtedly be used in the selection of, for example, women to be trained in this job. A further use to which research of this nature could be put is the allocation of boys and women to work in the factory or in the technical offices most adapted to their interests, temperament, talents, and achievement.

Women in Foundry Work: The work of the foundry is an important branch of industry that is often regarded (apart from coremaking) as unsuitable for women. But stress of war circumstances is rapidly changing preconceived ideas, and women are now being introduced into foundries to a greater extent than is commonly supposed.

Women had been employed as coremakers at one foundry for a number of years, but the claims of the services on male labor resulted in more women being taken on and—what is more significant—in the scope of their work being extended. A wide variety of types, embracing many thousands of different cores, is needed in the production effort which this firm is being called up to make.

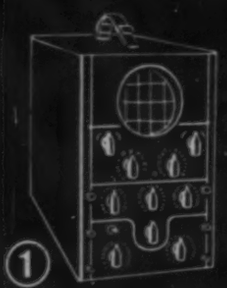
The core shop proved to be a most useful stepping-stone to the mechanized foundry, because of the experience it affords in ramming, venting and so forth.

Much of the arduous work formerly necessary has been cut out by the use of the raised sand hoppers, which enable the women to maintain an upright attitude as they work. The necessity to stoop for sand being thus eliminated and all the requisite tools being conveniently placed, physical exertion is reduced to a minimum.

The women of this foundry are in no danger from molten metal, as molds are cast by male labor, and placed upon a conveyor at the casting point. The women operators show great interest in their work, and the results so far are very creditable, comparing favorably with those achieved by men.

Similar satisfactory results have been obtained in the dressing shop, to which

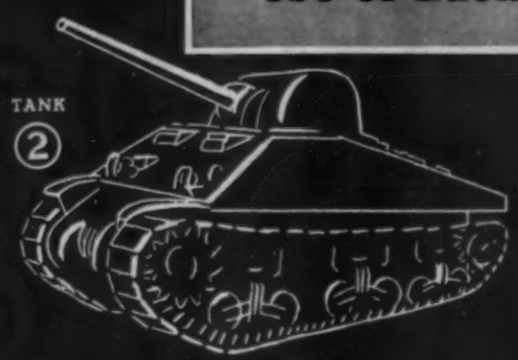
WIN A WAR BOND!... tell why



① CATHODE RAY OSCILLOGRAPH

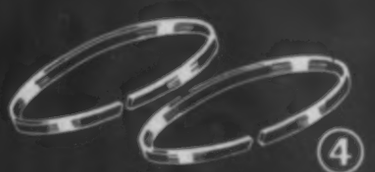
dag REG. U.S. PAT. OFF. **COLLOIDAL GRAPHITE**

IS IMPORTANT in the Manufacture or Use of Each of the Items Illustrated



② TANK

③ TUNGSTEN FILAMENT



④ PISTON RINGS

*The Lubrication of Piercers, Tools and Dies in Metal-Forming Operations

Lubricants containing "dag" colloidal graphite, used for various forging, punching, extruding, stamping and drawing operations, etc., provide the following advantages:

1. **Finer surface finish.**
2. **Closer dimensions.**
3. **Fewer subsequent machining operations.**
4. **Scale minimized.**
5. **Increased die life.**
6. **Man hours saved on replacements and redressings.**
7. **Lubricants can be sprayed—eliminates manual swabbing.**

"dag" colloidal graphite is not affected by the heat at operating temperatures and is not washed away by streams of water used for cooling. It is an effective and lasting solid lubricant.

Completely blended petroleum lubricants containing "dag" colloidal graphite may be secured from major oil companies. For those operations where water-soluble lubricants containing "dag" colloidal graphite are preferred, they likewise are available, in a completely blended, ready-to-use form.

Write for free leaflet entitled "The Treatment of Piercers, Tools and Dies Used in Metal-Forming Operations".

*A TYPICAL APPLICATION

How to Win

Acheson Colloids Corporation will give a $25.00 War Bond to each of the 5 people who submit complete and accurate answers together with the 5 best letters on the question, "Why is **"dag"** colloidal graphite important in the manufacture and/or use of the products pictured here?" (1) State business connections (no one in the graphite field or their families will be eligible). (2) All entries must be legible. (3) All entries must state the publication in which the advertisement was seen. (4) Entries must be postmarked not later than July 15, 1943. (5) In case of ties, duplicate awards will be made. (6) Entries become the property of the Acheson Colloids Corp. (7) The verdict of the judges will be final.

dag COLLOIDAL PRODUCTS

ACHESON COLLOIDS CORPORATION

PORT HURON • MICHIGAN

JEWELOX *Metal Working* CLOTH

THE JEWEL BRAND OF ALUMINUM OXIDE

Specially processed for high strength and maximum grain adherence, coated with the hardest, toughest abrasive in commercial use, Jewelox Cloth has proved its all-round usefulness. Jewelox Cloth is grinding rifle breech blocks, smoothing aircraft assemblies, polishing valve stems for aviation engines, finishing Diesel engine crankshafts for submarines . . . and doing hundreds of other "must" jobs as well as it did its usual peacetime work.

Jewelox Discs . . . standard in diameters from 4 to 53 inches, in grits from 120 to 16, and in both cloth and combination backings.
Jewelox Belts . . . sizes to fit any machine, grits to fit any job, made by the famous "Velvet Joint" process to end bumping and jumping.
Jewelox Rolls . . . in widths from ¼ to 28 inches, on light or heavy backings, in every grit. Handiest of all forms for many job shops.
Jewelox Sheets . . . every standard size, grit and weight of backing, correctly flexed for the work it is to do.

Order Jewelox Metal Working Cloth from Your Distributor, or Ask Us for Samples.

Abrasive Products, Inc., 511 Pearl Street, South Braintree, Massachusetts.

ABRASIVE PRODUCTS

SOUTH BRAINTREE MASSACHUSETTS

JEWELOX • JEWEL EMERY • JEWEL GARNET INC. JEWELITE • JEWEL FLINT • NEW PROCESS

the castings are passed from the foundry.

A psychological point of some importance is that these women are made acquainted with the purpose of the castings; and so much of their work is concerned with aircraft, the inevitable effect is to link their own individual efforts directly to the national war effort. Their response is significant of their determination to provide the tools by which victory can be implemented.

The firm is making increasing use of women as assistants to molders and coremakers. To enable them to convey the cores, etc. to the molders, mechanical transport has been provided wherever possible. Where this is not practicable, lighter tackle has been provided to enable the women to handle the loads.

Experienced male workers can also be used to advantage in supervising and instructing women on foundry work, and the response to such instruction has been exceptionably good. Care is taken in selecting the right men, and the women then appreciate the man's knowledge and experience of the work he is deputed to teach them.

The experience of another company also suggests that the old assumption that the foundry is not a suitable place for women is based on a misconception. While it is true that even the cleanest of foundries may not provide such attractive conditions as can the modern factory, much can be done to make the work attractive to women recruits.

This firm, for instance, felt that any lack of suitable amenities such as rest rooms or canteens was a deterrent to women that could be overcome without undue expenditure. The idea was translated into action, and a rest room has been combined with a first-class kitchen with gas cooker, wash basin and other domestic conveniences.

The women of this foundry have their mid-day meal (which comes from the local British restaurant) in the main canteen, where tables are specially reserved for them. They are allowed 10 minutes' break at 10 a.m. and at 3 p.m., and they finish half an hour earlier on Fridays to enable them to do their week-end shopping. They are also allowed reasonable time off when their husbands are home on leave.

This attempt to make their working conditions as attractive as possible has met with an encouraging response from the women, who give of their best. In a specimen period of eight weeks, for example, the total time lost has been only 4 per cent, which is very satisfactory when it is remembered that most of the women are between 30 and 40 years of age, married, and with families to look after. The spirit of these workers is indicated by the fact that if one of them

is absent the others "pull out" her work so the total output does not suffer.

At this foundry there are no known cases of skin or other troubles due to dirt or the materials handled, and the women appreciate that the risk of injury may be less than in a machine shop, owing to the absence of cutting tools, belts and so forth.

The best dress for a woman employed here has proved to be a trouser overall, and cap to keep the hair free from dust. These are provided by the company.

The class of foundry work which, in this firm's opinion, can best be performed by women, is summarized under processes, below: Pattern store, very suitable; coremaking, very suitable for small cores; sand mixing, quite suitable, with modern automatic loading and unloading devices; molding, suitable to a limited extent on light plate molding, and simple type machines; also as molder's helpers; fettling, quite suitable for grinding, rumblers, shot blast, and small portable grinding work; internal transport, suitable for cranes and truck driving, especially if elevating trucks are used.

Care should, of course, be exercised in selecting the right type of woman for the various jobs. In the pattern store, the nimble type of women is wanted. Previous experience on work involving order and care, and some familiarity with figures, will help her to look after the indexing and the booking in and out of patterns from the bins and shelves.

In this foundry, too, women and girls have for some time been employed in coremaking. Their finger dexterity makes them particularly suitable for work on the smaller cores, but they are also capable of larger work and can operate jolt machines quite successfully.

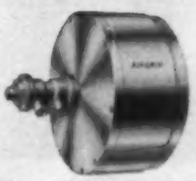
One woman does the spraying, cleaning and gumming of cores together, and cleans the shop generally. This has proved a very satisfactory arrangement.

The women are often proud of their hands, and careful of them. Most modern small cores are made of sea sand, which is very clean, and as the usual binder is largely molasses and linseed oil, this helps to keep the women's hands in good condition.

Sand for the core shop is usually mixed in small batches of a few hundred pounds at this foundry. This provides a suitable job for the strong, well developed women. They have proved very good at adding the right amount of water, binder, etc. They have been told to imagine they are baking at home—a happy illustration that has had good results.

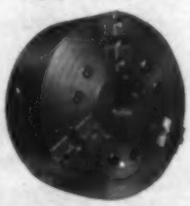
Another means of sand mixing which has been adopted here to relieve women of much of the tiring effects caused by stooping is the use of a bucket and an

ADD 25% + TO LATHE OUTPUT with an "AIRGRIP" cylinder and an "AIRGRIP" chuck!



"Airgrip" High Speed Revolving Air Cylinder

"Airgrip" Collet Chuck



Air Operated Universal Three Jaw Chuck

"Airgrip" Expanding Arbor

• You will be surprised at the speed with which lathes can be converted to high production machines, simply by the addition of "Airgrip" cylinders and air-operated chucks. You will be surprised again when you experience the results of power chucking—reduced operator fatigue, more parts per hour, and lower unit costs.

You will discover that machines equipped with "Airgrip" chucks can be operated at *full capacity*, that "Airgrip" chucking is independent of the human element for pressures on the piece part, that time saved will quickly pay for air chuck investment.

Write for the new "Airgrip" catalog!

Anker-Holth Mfg. Co.

"AIRGRIP" CHUCK DIVISION

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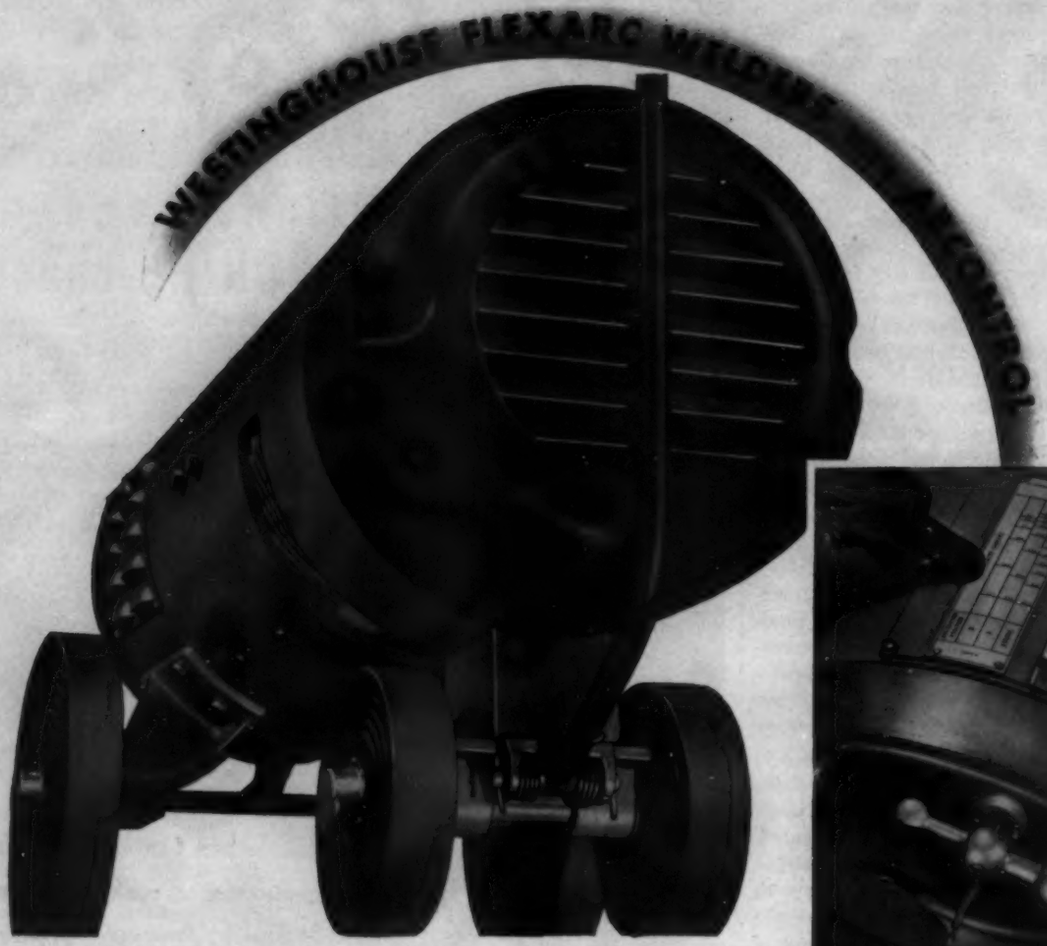


"SECOND GEAR" ..."low gear" for the tough spots

"fluid drive" welding on the straightaway!

- **JUST ONE ADJUSTMENT** gives exact welding current desired. No "nuisance gadgets"—exciters, rheostats or reactors.
- **ARCONTROL** gives choice of three types of arc.
- **NO "DROOP"** in welding current when machine warms up. Just pre-set—and *weld!*
- **BUILT TO "TAKE IT"!** Banging can't damage heavy, one-piece seamless steel frame! No tin boxes—all vital parts are *inside*.

Here's new, handy power for those tough jobs—with the same timesaving, rock-steady pre-set current adjustment that only Flexarc welders give you!

It's ARCONTROL. This new welding feature, combined with Westinghouse single, pre-set current adjustment—is just what your operators have always wanted. It provides simple current control—flexible enough to tackle any job.

New ARCONTROL brings you a choice of THREE optional ranges of operation. "Normal" range, like fluid drive, gives you fast, flexible operation that meets most conditions. "A" and "B" ranges, like second and low gear, provide reserve ranges of power for unusually tough conditions.

Speed your operator training by specifying easy-to-operate Westinghouse D-C Welders. Write for complete details. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

J-90470

Westinghouse **FLEXARC WELDERS**

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

automatic unloading device. A woman can easily be trained to operate this machine provided the sand is arranged in a convenient position to the bucket loader, so too long a shovel throw is avoided. Women have proved quite conscientious about mixing the proper proportions.

In the molding shop it has been found that women are very suitable for plate molding, provided the boxes are not too large. Simple machines, such as jolters, squeeze and turnover machines, are successfully operated to about 75 per cent of a man's output.

The younger and stronger type of woman is used as molder's helper, care being taken to ensure that the lifts are not too heavy. In this connection a smaller shovel should be used by a woman than that used by a man.

As regards fettling, the women at this foundry have been found particularly good on the smaller castings. They operate very successfully the rumblers and shot blast machines or barrels. For grinding small work their superior touch is a great advantage, and it has been found that they do a neater job than a man, particularly if high speed wheels are used. The use of crane trucks for handling heavy boxes has resulted in the saving of much time and labor; quite heavy boxes are dealt with by one woman in this foundry.

In the experience of this firm, no protracted training is required for foundry work. Except in actual molding, a woman becomes reasonably efficient within a fortnight.

On the question of comparative expense, it has been found that in the core shop, for instance, the costs now are no higher, with 50 per cent of the staff consisting of women, than when only men and boys were employed.

Volunteer Labor Service: British business men, including executives, are volunteering for night, Saturday and Sunday factory work in order to keep operations going continuously. In Birmingham, over 1200 volunteers work in some 20 plants. All volunteers are paid a standard rate for daytime work, but according to the factory scale if they work nights.

Utilizing Unskilled Labor: One engineering establishment affords an example of the remarkable changes effected in emergency by resourceful co-operation. This workshop did not exist two years ago; it had to be built, planned out, and have its machinery fixed and tooled up, while the labor was being engaged and trained. Moreover, this was the period when other establishments were competing for the cream of the available skilled workers.

Here is the labor position, two years later, in figures which speak for themselves: Skilled hands, 3.8 per cent; semi and unskilled, 40.8 per cent; females, 50.0 per cent; apprentices, 5.4 per cent. The women and girls work in the three shifts system, which is arranged to give each one a complete break of 32 hours each week. This was the answer to "How can I do my shopping?"

Examined from another angle, that of labor turnover, the remarkable fact emerges that over the whole period, only 5 per cent of the women initially engaged have left.

WELDED STEEL PART SAVES RUBBER

WELDING, in the example above, not only saves rubber and reduces weight but also enables a machine part to last longer, according to Lincoln Electric Co., Cleveland. Part is upper bearing support of knife frame of a bread slicer which must take up vibration and be flexible enough to allow for any discrepancy in machine alignment. Part at left is of rubber, while the other is of welded steel. Welded unit is expected to last the life of the machine. Its weight is ½ ounce less than the rubber unit

for use with the

UNIONMELT*

PROCESS

5 REASONS

WHY THE MAJORITY OF UNIONMELT USERS PREFER Westinghouse A-C Welders

1 Westinghouse transformer equipment is specially designed for use with the Unionmelt welding head.

2 Control and transformer are combined in the compact 1000-ampere welder.

3 Built-in power-factor correction reduces power demands.

4 Single pre-set current control speeds adjustment—simplifies operation.

5 Natural air cooling eliminates fans.

The Unionmelt Welding Process is the fastest known method of making butt, fillet, and plug welds—up to 20 times faster than any other method. Working together, Unionmelt equipment and Westinghouse A-C Welders form a team that will give you faster continuous production at a new low cost. Write for full details—ask for Booklet B-3090. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pennsylvania. J-90470

* Unionmelt is the registered trade-mark of The Linde Air Products Co.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

These women are doing work that represents a war effort of great importance. They are on center-lathe turning; operating combination turret lathes; operating horizontal borers; operating turret lathes; operating slotting machines; trimming and filing benchwork; driving overhead cranes; driving floor-controlled cranes.

These women are engaged in producing aero cranks and shaft screws for Hercules aircraft; spiders and hubs for de Havillands. Since the weight of these components is approximately 200 pounds, much too heavy for a woman to lift, we will examine how this difficulty was overcome.

Unskilled men are trained to feed the machines, tighten chucks or clamps, and release the components; this leaves the women free to do the operating. One man can look after six machines. This keeps the batteries very busy, and by this method the shop is producing 400 completed components per week, which is equivalent to 14 tons of finished parts; and the output is increasing week by week.

One scheme in this shop, although contrary to a widely-held theory, works wonderfully well. The new workers, both male and female, are not encouraged to use or learn to read micrometers, verniers or indicators. Instead, all machines are correctly tooled and stopped to work to approximate plus or minus 0.005-inch.

This has been done to relieve the operators from the worry and anxiety of fine limits. They are encouraged to feel that theirs is a straightforward job, and the management thinks this attitude is largely responsible for their small percentage of loss of labor.

This method, by giving the new workers more confidence in working, increases their production. Whatever the reason, the method has proved successful in this instance.

We like the "TOUGH" and "FUSSY" jobs!

FINDING ways to solve the "unusual" problems in springs and wireforms is a "usual" task for Accurate engineers. They like to tackle the problems that demand imagination in tooling and production planning — and in testing and inspection devices, many of which are built especially for the job. Accurate engineers and production men have the experience and "know how" that offer short cuts to time, labor and material savings.

No requirements of a spring user are too exacting for Accurate Service — no problems too complex. Accurate customers know that—and if you have spring or wireform problems you will be pleased to discover it too. Send in your specifications or ask to see an Accurate engineer. You will like Accurate cooperation, quality and service.

Send for the Accurate "Handbook on Springs"— it's convenient to use and informative — free, of course!

Accurate Springs

ACCURATE SPRING MFG. CO., 3823 W. Lake Street, Chicago, Ill.

Attendance Very Good

Another noteworthy fact is that the average attendance among women is excellent. What little loss of time has occurred has been due to married women, and to the responsibilities attendant upon that state. On the whole, however, attendance is excellent.

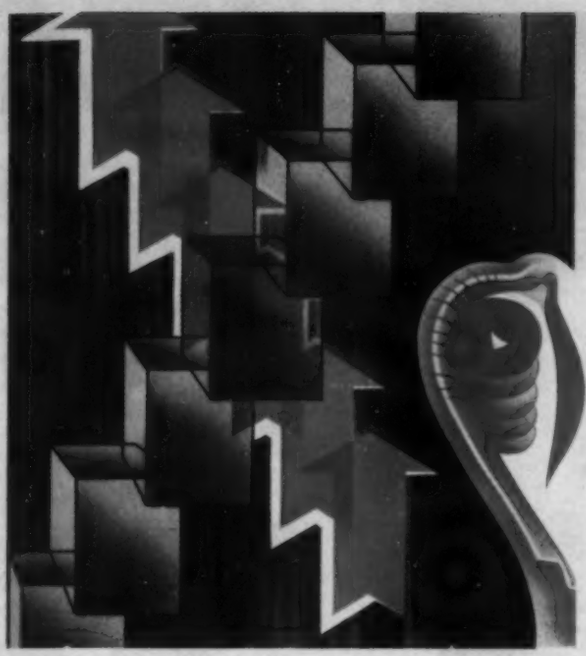
In the electric arc furnace department of a large firm in Wales, women operate a 25-ton overhead electric crane. This crane handles 10 tons of molten metal which is poured from the furnace, the total weight of ladle and metal being approximately 18 tons. The crane drops the ladle under the "runner" and then carries it to the teeming pit full of the molten metal. It then holds it dead over the ingot into which the metal is teemed.

A Man's-Size Job: It is generally recognized that the operation of this crane is a job for a man. It certainly requires coolness and accuracy, any mistake would be a costly business. Women are, however, successfully performing the work on all three shifts. The woman on the morning shift (6 a.m.—2 p.m.) works entirely on her own without male supervision.

In the blooming mill at the same factory, a pulpit man operates the rolls that reduce the ingot to a semifinished bar. On the other side a woman does the work, at present under supervision. On the pulpit from which she operates the "bar" is thrown across to the "finishing" rolls, where it is reduced to correct size and then sent to the bar bank. One woman is employed on each shift, and they are doing the job extremely well.

Juvenile Welfare: Experience in factories of the Southern region shows that the productive work of juveniles is greatly assisted when the firm's welfare officer takes special care of their interests. Cases of absenteeism, for example, can then be dealt with promptly. Young people who work long hours frequently feel they need extra rest; and they benefit if they can go to the personnel officer for advice and help.

It is found they will talk frankly



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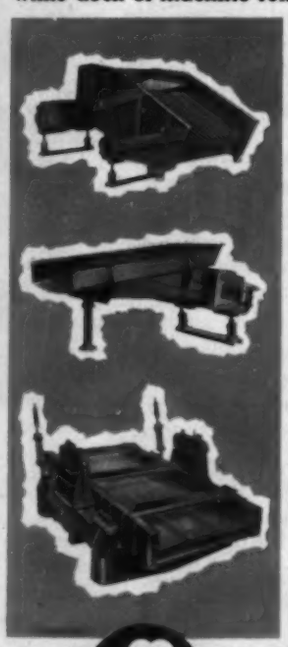

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A.S.T.M. Issues Standards For Copper and Alloys

A.S.T.M. Standards on Copper and Copper Alloys; paper; published by American Society for Testing Materials, 260 South Broad street, Philadelphia, for $2.25; order of ten or more for $1.75 each.

This 385-page book gives in latest approved form, as of February, 1942 all A.S.T.M. standards on copper and copper alloys, more than 85 standards covering cast and wrought material, alloys used for electrical conductors and nonferrous metals used in copper alloys.

It is published under sponsorship of committees B-1 on copper and copper alloy wires for electrical conductors, B-2 on nonferrous metals and alloys and B-5 on copper and copper alloys. Important are the emergency alternate provisions and emergency specifications, to aid in expediting procurement.

Fifteen of the specifications cover copper and copper-alloy wire and cable, including new emergency specifications for lead-coated and lead-alloy coated alloys, such as lake copper, fire-refined copper other than lake, phosphor tin, nickel, pig lead and emergency specifications.

There are some 16 specifications in the field of copper plate, sheet and strip, including cartridge brass sheets, case cups, gilding metal, etc. Standards pertaining to rods, bars and shapes number 15 and to copper pipe and tubes about nine.

One section includes several widely-used specifications on copper-base alloys for sand castings. Included also are standard methods of test, including expansion test (pin test), mercurous nitrate test, hardness conversion table and other test procedures.

Steel Cartridge Cases

(Continued from Page 95)

developed yield strength of 88,000 pounds per square inch. It was discovered then that a stress relief treatment would increase this to between 94,000 and 100,000 pounds per square inch, roughly a 10 per cent increase. Some metallurgists point out the similarity of this treatment of steel to precipitation hardening such as is practiced with aluminum alloys.

However, it was necessary to develop still more strength, so an additional cold draw was tried and yield strength went up further to around 107,000 pounds per square inch. This began to look exceptionally favorable, particularly since these early metallurgical tests were made on cases from experimental dies. Meanwhile production dies were being completed and some preliminary test cases run in them shows yield points from 116,000 to as high as 124,500 pounds per square inch, and tensile strengths from 125,700 to 130,500 pounds per square inch. One heat of steel with manganese content running around 1.05 per cent and carbon 0.19 gave even higher strengths, indicating the beneficial effects of manganese on cold-working properties.

Specification of 105,000 pounds per square inch minimum yield strength for steel shell case material is necessarily somewhat arbitrary, since it is difficult to measure the actual stress on the material in the firing operation. It is calculated that the internal force of the explosion in proof firing is 42,600 pounds per square inch or about 16 per cent in excess of combat firing stress. In terms of tension stress on the thin-walled steel, this force can be shown to be in excess of the tensile strength of the steel, but it must be remembered that the shell case has the solid restraining wall of the gun chamber to limit the extent of strain on the steel of the case. Under the heat and impact involved, the chamber itself will undergo some strain, but because of its large bulk easily returns to its orinigal dimensions. However, by noting the modulus and tensile properties of brass cartridge cases now in use, and translating them in terms of the stress-strain curve to steel, it is possible to develop the empirical 105,000 pounds per square inch yield strength as the minimum admissible in the steel case.

The 75-millimeter cartridge case, produced in steel to the same dimensions specified for brass, is 13.820 inches long, with base diameter of 3.193 inches tapering to diameter at the mouth of 2.9175 (plus 0.0125, minus 0). This represents a taper of 0.009-inch per inch, uniform except for a slight recess or necking-in

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at a point 11.58 inches from the base to permit a press fit of the projectile. Wall thickness at the top or mouth is 0.040-inch (minus 0.010), and this increased gradually and uniformly to the base where wall thickness just ahead of the inside fillet is about 0.125-inch.

The shell is drawn from a 1¾-inch thick "slug" of 3⅛-inch hot rolled bar stock, weighing 3.5 pounds. Finished case weighs 2.81 pounds. Base of the case is machined with a flange measuring 3.4260 inches in diameter, in the center of which is bored the primer hole, the latter counterbored to receive the firing cap. These holes must be machined to exceptionally close tolerances. For example the primer hole has a taper of only 0.006-inch per inch, while there is a limit on the counterbore depth of the 0.002-inch.

Before going further, it may be well to trace the sequence of manufacturing operations developed by Buick engineers for the complete processing from the slug to the finished case. Originally it was thought possible to complete a case with a series of 19 operations, but this has now been expanded to the list shown in Table I.

Not shown in the Table I listing are a score or more of checks on the case made by gages as it proceeds through the various shaping operations. After each step in the process which alters the shape from the previous step, a gage is provided alongside the equipment to check every piece or possibly only one of every certain number, if the working is not too severe. Prior to the stress relief heat treatment, all the cases pass along a series of inspection benches where both company inspectors and government inspectors pass each case through an assortment of gages to measure length, diameter, etc. Most of these gages are of the go and no-go type to facilitate rapid checking.

Returning to the series of processing steps outlined in Table I, a more detailed discussion may serve better to tie them together and also will throw some light on unusual methods and equipment devised for the procedure. The first five operations are routine and need no further comment except to point out that the centerless grinding, step 3, serves to provide a smooth outside surface to the cylindrical steel piece, so that no seams, scratches or other surface depths will be carried into the initial draw die and thereby remain on the surface during subsequent steps.

Heating for the hot cupping operation, step 6, is done in a specially built Tocco induction heater, the piece being brought to temperature in 1½ minutes. The equipment has two fixtures which may be operated simultaneously, permitting a production rate of 80 pieces per hour. During the brief period of heating, a yellow gas flame is directed onto the steel, enveloping it and preventing scaling. The current kicks off when the piece has been brought to temperature, and it is then transferred to a gas-fired muffle furnace where it is held or "soaked" for 7 minutes to insure an even temperature throughout the steel.

Cupping is done in a standard forging press of the crank type, common to any automotive shop. In fact, equipment formerly used in forging and stamping operations on automotive jobs has been largely found suitable for work on steel shell cases, requiring only new tooling. On the hot cupping press, the upper die is simply a high-speed steel punch, nitrided for improved wearing qualities. End is rounded to form a smooth radius at the base of the cup. Lower die has a cavity the size of the formed cup, or virtually the same diameter as the heated blank. The punch forces the blank into the cavity and the hot metal flows up around the punch, elongating the blank from 1¾ inches to about 4 inches. A standard forging grease or graphite paste is used to lubricate the dies and there is no trouble with sticking of the formed piece since

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a stripper on the punch removes the part on the up-stroke of the punch.

In the early stages of the work, only one hot cupping operation was used, but it was later determined that better results could be obtained if a second hot operation was carried out after the piece had cooled to a somewhat lower temperature. As the parts come from the first hot press, they roll down a sheet metal trough to the second hot press which is virtually the same type of equipment as the first press, except for slightly altered tooling to extend the draw 2 inches further, or to about six inches.

While it has been the standard practice to start with a 3-inch diameter blank to form the 3-inch case, recent experiments indicated that by starting with a somewhat larger blank, it is possible to get a better filling of the dies in the hot operations, and a better compacting of the metal for subsequent steps. Hence the blank diameter has been increased to 3⅛ inches but with no essential changes in the method.

Operation No. 9 is done cold after the formed cups have cooled in air. It is an extra operation perfected after the original setup had been worked out and serves to give an accurate sizing to the wall thickness of the cup, as well as to draw it out slightly more before the more drastic cold work of operation 16.

Case Is Annealed Then Sized

After annealing, followed by the acid pickling and washing to remove scale, the head of the cup (the portion that will eventually become the base of the shell) is restruck in a crank press to size it accurately as well as to give it some extra cold work. This is necessary since in the cold drawing of the walls, the head does not receive as much work as the walls and thus may not develop the desired strength.

The Bondrite treatments serve both to clean the surface of the case thoroughly and to etch it slightly so that minute pockets will be formed which can serve to retain drawing compound in the cold operations. Further, the thin surface layer of manganese phosphate deposited in this chemical treatment is soft and acts as a lubricant in the cold drawing.

Hydrogen embrittlement resulting from the acid pickling operation would result in many failures during cold drawing, so the cleaned and etched "cups" are annealed for 30 minutes to drive off any hydrogen that has penetrated. This anneal does not affect the surface condition of the steel.

Special types of automatic trimmers have been built to cut the bases to length before cold drawing. One at a time, the cases are clamped on an expanding arbor which swings them up against a rapidly rotating steel cutting wheel. The arbor retracts, collapses to discharge the trimmed case, and the scrap end rolls down a chute to a scrap box while the next case advances in position to be located on the arbor. The entire operation is automatic, the operator merely keeps the loading chute filled with cases and the trimmed pieces carried away.

Probably the most interesting step in the entire operation is the series of four cold drawing operations, all carried out on a single 750-ton Clearing double-acting press with die opening about 144 inches wide and 70 inches front to back. The four punch and die stations are spaced to form the four corners of a rectangle well within the normal platen area, and are so arranged as to carry approximately an equal load, or somewhere near 150 tons per station. The depth of draw varies slightly over the four dies and is controlled by the length of the punch.

The case progresses from left-hand die to the right-hand die on one side of the press; then is handed through the die opening and placed on the die directly across from the second station, and finally moves to the right-hand die

AMPCO CASE HISTORIES

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on this side. Four operators handle the press, one at each die station. Each punch has an integral mechanical stripper which removes the part after drawing.

On this press the 6-inch deep cup is drawn out to the approximate form of the shell casing and 15 inches deep, or a total draw of 9 inches with no substantial change in diameter. This is a real test of the drawing qualities of the steel, and it is remarkable to note the few pieces which are split or torn in these severe operations. Special types of drawing compound were developed by Buick engineers. Base material is machine oil.

Up to this point the formed case is a true cylindrical shape on the outside. Thickening of the wall progressively toward the base or head is taken care of by the inside tapering. But the finished case must have an outside taper as mentioned before and also must have a flanged base. The latter is formed cold in a press equipped with a two-stage die.

The lower die is built so that after the first stroke it can be slid on ways crosswise the press, bringing the second die impression under the punch carrying the case. The third stroke strips the case from the punch. In these operations the steel in the base is flared out so that the flange can be machined to fill this expanded rim being furnished by the extra thickness formed around the outer edge in the original hot cupping. Thus, after the cold heading operation, the head becomes finished off flat. Study of the series of cross sections showing sequence of operations will clarify this.

Tapering operations (No. 24) are perhaps the most critical of all the steps, since the cold steel must be persuaded to flow into the desired taper in these two press operations without showing any signs of wrinkling or distortion and without the support of a punch on the inside, the case simply being forced up into a tapered die cavity in two stages, both on the same press. The second stage does have a punch which extends about 3½ inches into the case, but this is required not for the overall taper but for the slight "pinching down" at the point about 2¼ inches from the mouth, as mentioned earlier, required for the pressfit of the projectile.

Annealing "Softens" Mouth

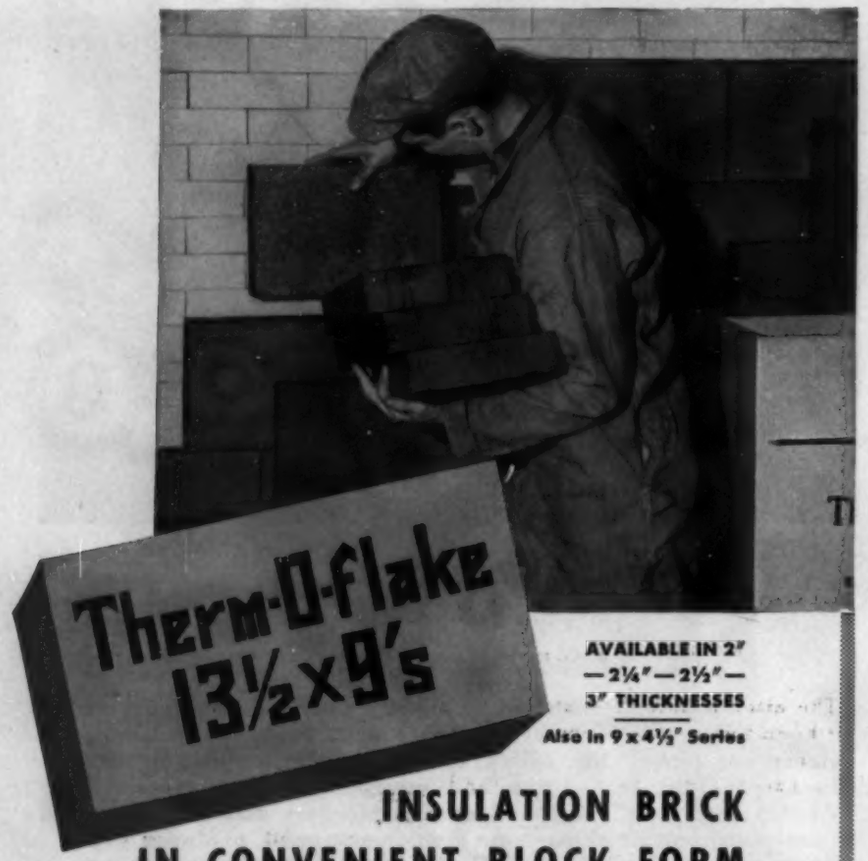
Punches used on all the cold drawing and tapering operations are of high-speed steel, and are nitrided and chromium plated. These treatments improve the wearing qualities, and the chromium plating also reduces the friction. Lower dies in the cold operations are generally steel rings with tungsten carbide inserts on the working surfaces.

Annealing (No. 23) before tapering is quite critical. It is concentrated at the mouth end to a depth of about 2 inches since the major portion of the cold work is concentrated mostly in this area.

Cases are mounted vertically on a conveyor and moved between two rows of gas burners of the cup type. These are mounted in a furnace horizontally at the proper height to concentrate their short intense flames on the mouths of the cases as they travel down the "slot" in the furnace. There are 24 burners in each row and they are right next to the other. The cases are rotated slowly as they travel past the burners.

After the tapering operations the mouth end becomes appreciably harder because of the cold working, so it is annealed once more, this time for a depth of about 3½ inches from the open end. This "softens up" the mouth and assures complete obturation in firing —that is, a tight seal in the gun barrel to prevent the explosion from blowing back into the breech—as well as avoiding a split case in firing because of too great a hardness at the mouth.

After wire brushing to remove any



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oxides developed in the annealing treatment, the cases are inspected, gaged and transferred to automatic lathes which face the head, rough form the flange, finish form the flange and drill the primer hole (operations 27 and 28). These lathes have five stations, four for the machining operations and one for loading and unloading.

Reaming and counterboring the primer hole are done mostly on vertical machines.

Great care must be exercised in these operations, since specified tolerances are unusually close. The machined case then is polished on the outside, using a double-head polisher handling two pieces at a time. Each case is mounted on an arbor which holds the part against the 16-inch polishing wheel of 120-grit emery by means of spring action. Both wheel and arbor revolve, in opposite directions, with the arbor advancing the case along the wheel until the full length has been traversed and about 0.0025-inch of stock removed from the diameter.

Varnish Replaces Copper Plating

Then follows detailed inspection by the two inspection crews mentioned previously.

One particularly unusual type of inspection device has been developed to permit close observation of the interior wall of the case. A cone shaped piece of steel slightly smaller in diameter than the case is chromium plated to a mirror finish on the outer surface of the cone. A wire is attached to the apex of the cone and a small light arranged to illumine the interior of the case and the bright surface of the cone. The unit is lowered to the base of a case and drawn slowly upward while the inspector watches the mirror surface. The inner surface of the case is reflected in magnified form therein, so that any surface defects are readily observable.

Final stress relieving is done in a batch-type electric furnace, accommodating 316 cases at a time. As mentioned before, this heat treatment adds roughly 10,000 pounds to the yield point and tensile strength of the steel case. Neutral or slightly reducing atmosphere is maintained in the furnace.

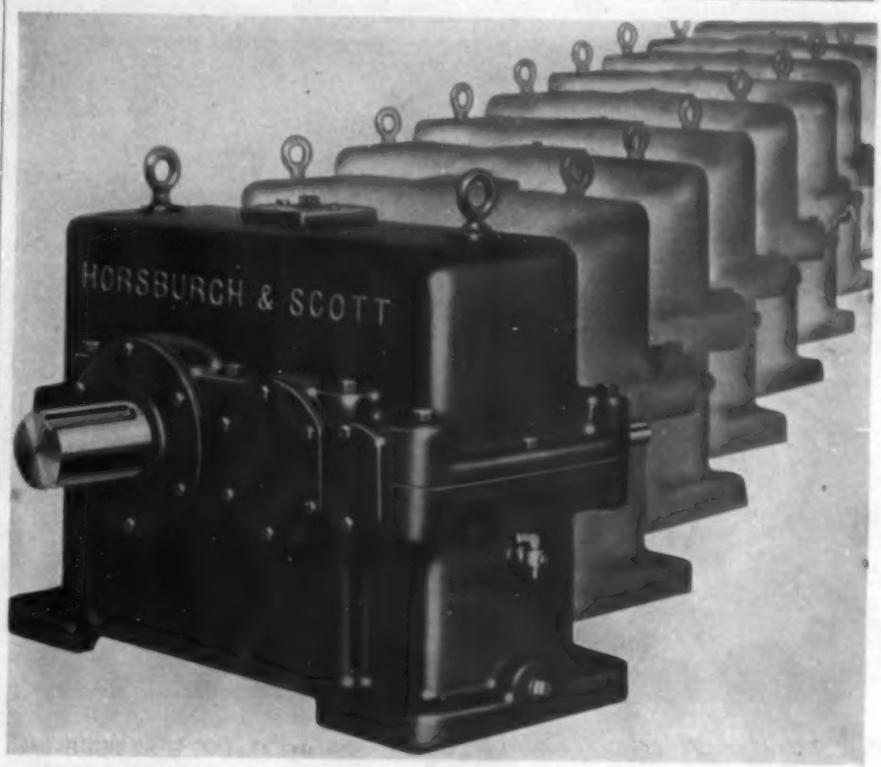
Originally the cases were finished by copper plating, which both protected them against corrosion and improved the sliding action in the gun barrel. Because of the critical situation in supply of copper, it was decided to eliminate this finishing by substituting a baked phenolic finish or resin-impregnated varnish.

In ordnance circles this is regarded as a sensational innovation. It is proving thoroughly practical.

The painting and baking operations are fully automatic, the cases being mounted vertically on a conveyor, with open end up. They rest on fixtures attached loosely to the conveyor chain so that as they pass the spray nozzles they can be spun by contact of the round fixture base with a moving rubber belt, driven by electric motor. One spray nozzle is mounted on a traveling arm which descends into the case and lifts out at a uniform speed while the nozzle directs a spray of varnish over the whirling surface. At the same time outside nozzles are positioned to coat the base and outside wall thoroughly and uniformly.

Once coated, the cases are carried slowly between two banks of infra-red lamps, 64 on each side. The conveyor loops twice at the ends of the lamp bank, so the cases travel three times through the baking zone, requiring 48 minutes in a temperature approximating 360 degrees.

When they finally emerge at the opposite end from the painting station, they pass through an exhaust cooling hood and on out to an unloading station where they are thoroughly dry and cool enough to handle by the men and prepared for further operations.



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Draw Straightening

(*Concluded from Page 98*)

and screwed up to distort the ring approximately 0.015-inch beyond true in a direction exactly opposite the original distortion. When the final draw is completed, the fixture is removed and it generally will be found that the ring is true to shape.

The method shown on the right, Fig. 4, is for the same purpose. It employs two long threaded studs and two flat bars, properly drilled. Exactly the same procedure is followed with this fixture as mentioned above, namely a preliminary draw, followed by the final draw at 500 degrees Fahr. Generally speaking, the fixture on the right is to be preferred, as the inside type of fixture may produce a hexagonal effect on the gear if not handled with considerable care.

Fig. 4 also shows in the foreground a type of draw fixture which has a wide range of uses. Here it is being used to straighten a number of flat oil-hardening sections. These, of course, are preheated prior to the final draw in course of the work.

An extremely valuable application for draw straightening is in connection with long sections such as shear blades, or press brake dies like that shown in Fig. 1. The picture was taken just before the part was given the preliminary draw. The amount of distortion is plainly evident at each end. After this draw, the fixture was tightened up and the final draw brought the part down to straightness tolerances.

Draw straightening is an extremely valuable method for handling a wide range of parts. In addition it is a relatively safe procedure. The main precaution to observe is that a suitable preliminary draw be given so that the parts can be clamped straight without danger of cracking. The final draw, of course, is based on the final hardness that is required.

Ribald and often profane, he greets the gamut of weather believing that his youthful ideals are hidden by a rugged outpouring of words.

But out in the shelter of fox holes, or slogging through mud to a post near the front, he communes with his thoughts as companions. . . . A picture of home is in his memory—he thinks of poignant moments he hopes to recapture, when he comes back, matured from a Galahad boy into manhood.

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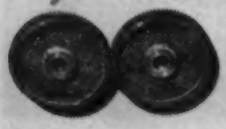

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Soldering with War Time Solder Eased by New Flux

A new flux, that breaks down lead-rich solders into an absolute fluid that will flow into inaccessible places is reported by Lloyd S. Johnson Co., 2241 Indiana avenue, Chicago.

Known as Lloyd's No. 6 soldering fluid, the product solves the problem of soldering with low tin-content solders. It is a flux that has high enough capillary action to make solder flow evenly and completely through solder joints and provides even higher tensile strength than heretofore obtained with 50-50 solders, it is said. It is ideal for soldering zinc-coated sheet metal (both galvanized and electro-plated), lead coated sheet metal, tin plate, terne plate, brass, copper, steel and all types of sweat fittings.

The material does not crawl or creep, has no irritating or choking fumes. It is so highly concentrated that it can be diluted with one or two parts of water for materials that are easy to solder, the company states.

Plastic Insulation Speeds Chromium Plating

Landing gear struts for airplanes now are chromium plated twice as fast by using a tube of Lucite methyl methacrylate resin to protect the treated end during plating, the plastics department of E. I. du Pont de Nemours & Co., Wilmington, Del., reports.

Electroplaters have discovered that Lucite makes a very durable insulating material in chromium electroplating baths, the company says.

Electroplaters who have used the plastic to insulate the positive and negative anodes in their chromic acid baths report that it stands up indefinitely in the acid, and retains its shape according to the company.

Presses for Briquetting

(*Continued from Page* 104)

aproximately 4 tons per hour for this machine.

With the advent of a reliable power pumping unit of the rotary piston type, using oil as a medium, the oil-operated briquetting press came into use. Such a unit is shown in Fig. 4. It consists essentially of a main cylinder assembly which is supplied with power from a rotary pump direct driven by an electric motor. This briquetting press has a stationary compression plunger mounted on the back head of the machine and a mold actuated by two double acting cylinders for stripping the briquette from the mold.

Compensates for Inequalities

The stroke of the main compression plunger is sufficient to take care of any inequalities in filling the mold. To simplify the functional arrangement of the press, the turnings first are passed through a breaker which serves to reduce them to a size which will enter the mold box (cutting compounds also are removed prior to briquetting by passing the chips or turnings through a centrifuge.) The chips then are fed to a vibrating pan on the machine located next to the mold hopper. Precompression takes place by means of two auxiliary cylinders whose movement also serve to close the mold cavity so that the charge is pushed forward and compressed in the main mold as the main plunger moves forward to complete the compression cycle. The main plunger and the compactors then return to their initial position while the briquette is being stripped automatically from the mold. The entire cycle is fully automatic. A 325-ton machine, making eight strokes per minute with briquettes 6 inches diameter, approximately 3½ inches high, will produce briquettes 60 per cent of solid at the rate of 3 tons per hour. A smaller machine, capacity of 225 tons, of similar design produces briquettes at the rate of 2 tons per hour.

Both machines are fully automatic in operation and are provided with power-conserving features which are effective during the so-called idle or approach stroke.

The second type of machine is the baling press which may be subdivided according to whether it is to handle light or heavy sheared scrap. These types of machines produce large bales, a continuous machine being available for light-gage sheet steel, and a machine which makes a single bale per cycle for the heavier material.

The machine for handling light scrap when high density is not required may be of the mechanical type but for the higher density a hydraulically-operated machine is used such as shown in Fig. 3. This machine is entirely automatic and a cycle requires but one man for the operation of the machine proper. The baling box is 16 inches wide, 6½ feet long and 6 feet 10 inches deep. Fig. 5 shows the machine in the charging position with a charge in the box. The initial compressing makes a bale 16 x 16 x 78 inches after which the main plunger moves forward, forcing the material into the compression chamber and forming bales similar to those shown in Fig. 6. The density of the bale is controlled by three clamping fingers operated by hydraulic cylinders which press against the sides of the previous bale in the compression chamber. These fingers are retracted during the ejection of the bale from the compression chamber. Power for this baler may be supplied by an accumulator system for the primary compression stroke and from a direct acting duplex pump for the final compression stroke. Operating economies are effected by this method as only the actual power needed is supplied during the work stroke.

The average length of bales is 14½ inches and weight 400 pounds with a production of 25 tons per hour.

For heavier gage scrap, which has

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been reduced in size by shearing so it will enter the charging box, a baling press of the 2-cylinder type usually is employed. This machine has an auxiliary horizontal plunger for primary compression at right angles to the main compression stroke. After the charging box is filled, the top is closed by a cover, either air or hydraulically operated, and the initial compression takes place. This movement having a definite travel limit also serves to determine the second dimension of the bale, the first being determined by the width of the box. The final compression then takes place at right angles to the initial one. Pressure is released so the cover may be retracted and the bale ejected by the main cylinder which usually is placed beneath and at the outer end of the charging chamber.

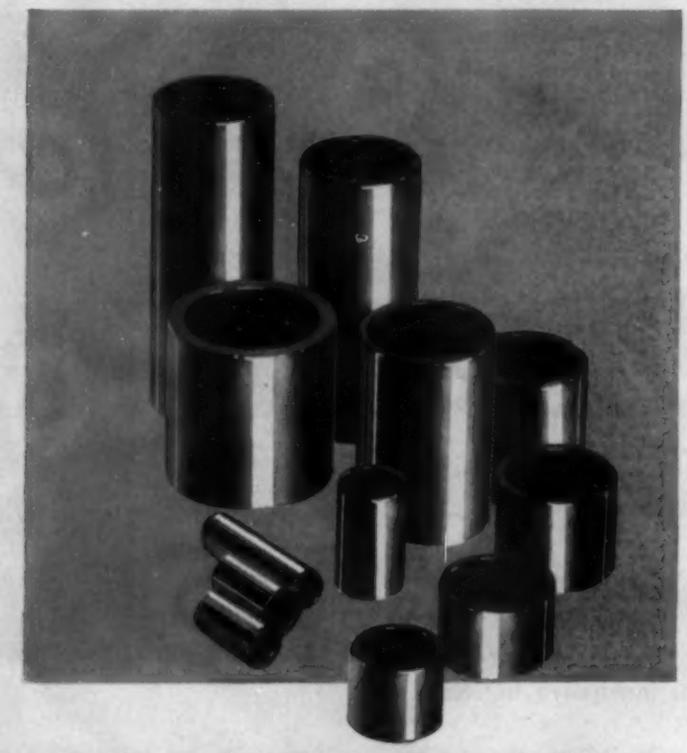
Door Is Air Operated

Power usually is derived from an air line for closing the cover while fluid is supplied direct to the initial and final compression cylinders by a direct-connected motor-driven reciprocating high-pressure pump.

Machines of this type have capacities of from ¼-ton to 8 tons per hour, the bales 11 x 4 x 4 inches and 20 x 15 x 15 inches weighing 25 and 400 pounds, respectively, with intermediate sizes of units and corresponding bale dimensions and weights.

Limitations of the baling machines are fairly well defined but for briquetting it always is advisable to run compression tests to determine the characteristics of the material to be handled. This is especially true of alloy steel chips and turnings. The result of such tests will indicate the feasibility of such work.

For any considered installation there are other factors involved which will require careful study such as storage space, handling of scrap and finished briquettes or bales and removal of cutting compounds. The economies of properly preparing scrap for remelting are well known. The tonnage to be handled and the investment required, therefore, would seem to be the determining factors in deciding whether a particular installation is justified.



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Practice Now Lists Fewer Sizes of Tanks, Boilers

Simplified practice recommendation R8-42, "Range Boilers and Expansion Tanks", promulgated by the National Bureau of Standards, Department of Commerce, Washington, and now in effect on new production, lists only 6 sizes of boilers and 4 sizes of tanks and promises an estimated annual saving of 13,000 tons of iron and steel, it is reported.

An emergency revision of a simplified practice program adopted by the industry in 1923, it reduces the number of sizes and varieties of range boilers then manufactured from about 130 to 13. It was developed in co-operation with the plumbing and heating branch of the War Production Board and industry representatives in order to (1) eliminate the use of critical metals in non-essential production, (2) conserve machines and manpower, and (3) reducee inventories to a minimum.

The new simplified list of boilers and tanks is included in Limitation Order L-199 issued by the WPB. In addition to listing size, capacity and working pressure for boilers and tanks, the recommendation specifies the size, number and location of tappings, as well as type of construction.

After the expiration of the Limitation Order this recommendation will again be subject to regular review for revision or reaffirmation by the industry's standing committee.

Pending printing, mimeographed copies of R8-42 may be obtained without charge from the Division of Simplified Practice.

New Gage Thus Far Saves 843 Tons of Steel

A "stitch-in-time" shell gage developed by Willys-Overland Motors has to date saved the government 843 tons of steel and thousands of valuable man hours in the production of close-tolerance 155-millimeter projectiles, members of the Toledo Rotary Club were told recently by Joseph W. Frazer, president.

Designed to eliminate shell forgings errors, he explained, the gage saved more than $100,000 in materials and reduced rejections from approximately 10 per cent to less than 1 per cent. After the gage was installed, he added, Army inspectors refused less than 200 shells out of a total of more than a million.

If rejections would have continued at the previous rate, he said, nearly 3500 units would have been turned back. In addition, the instrument was responsible for salvaging 8000 forgings, it saved $18,000 in labor costs for inspecting the shells, and $31,000 in labor costs previously required in "hospitalizing" over-weight shells.

ASME Appoints New Manual Committee

The 1939 edition of the ASME manual on the cutting of metals is now being considered for revision by a new committee, American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York, reports.

The reorganized committee consists of M. Martellotti, chairman, Cincinnati Milling Machine Co.; O. W. Boston, University of Michigan; T. F. Githens, Cleveland Twist Drill Co.; M. F. Judkins, Firth-Sterling Steel Co.; M. E. Lange, Warner & Swasey Co.; F. W. Lucht, Jr., Carboloy Co. Inc.; and F. J. Oliver, "The Iron Age".

Personnel of this committee was named by the research committee of the society and it is known as a subcommittee of the society's special research committee on the cutting of metals. Whether or not the manual will be completely revised at this time, the committee is still undecided.

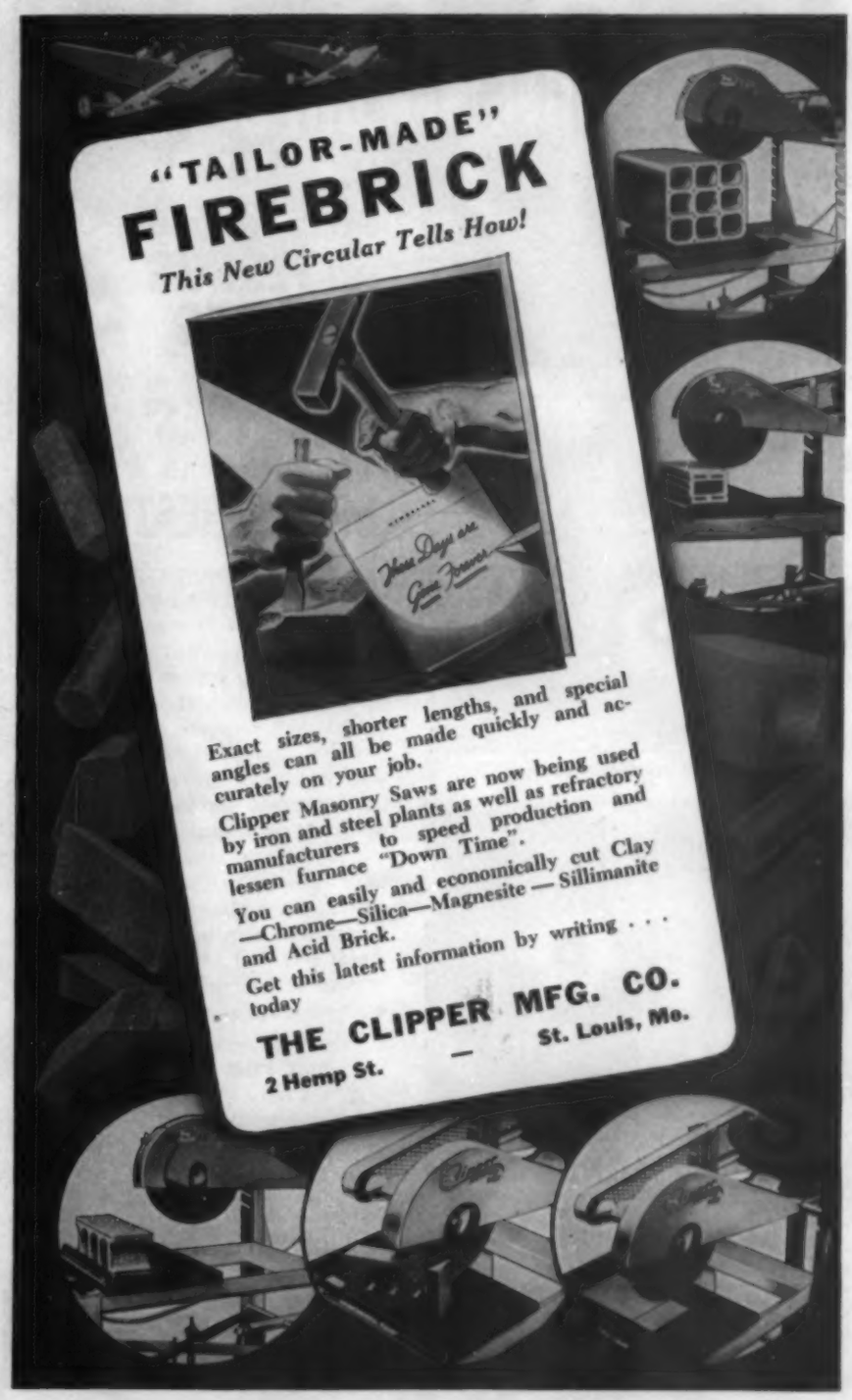
AC Electronic Drive Provides 20:1 Speed Range

An adjustable-speed electronic motor drive developed recently by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., it is reported, can be used in any industry on applications that require constant preset speed at varying loads over a 20:1 speed range and smooth, automatic acceleration and deceleration.

Flexibility of a direct-current motor drive with an alternating-current supply is obtained, it is said. The incoming alternating-current power is converted by grid-controlled rectifier tubes and supplied to the armature and field of the direct-current motor. This drive provides constant torque for all speeds up to the base speed of the motor and constant horsepower above base speed.

Although many solutions have been offered with some degree of success, none of these are without some undesirable feature, whether it be speed range obtainable, speed torque characteristics, first cost, maintenance or mounting difficulties. In many instances where direct-current power is available, the standard direct-current motor does not completely fulfill all requirements; such as, extremely wide stable speed range, good speed regulation and smoother automatic acceleration.

This new motor drive, known as the Mot-O-Trol, was designed to fulfill the desired requirements of an alternating-current, adjustable-speed motor. The basic idea is not new. Westinghouse furnished such motor drives on special applications for some years, but recent refinements eliminate many of the earlier handicaps and make the new elec-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tronic system comparable or better than existing solutions.

Thyratron tubes supply a shunt-wound direct-current motor with rectified alternating-current power. In general, the system consists of a single or polyphase grid controlled, thyratron tube rectifier, that takes power from an alternating-current line and rectifies it into direct-current output. The rectified direct-current voltage is applied to a regular shunt-wound, direct-current motor and may be varied from zero to motor rated voltage (or above) for direct-current armature control. Smaller thyratron tubes used in the control provide rectified direct-current field current for the motor. The field voltage is held constant throughout the range of armature voltage and then is reduced to provide greater speed range by field weakening above the base speed of the motor.

The electronic control for motors 1 horsepower and smaller, uses single-phase, full-wave rectification on both field and armature. For motors of larger horsepower rating a two phase-full-wave or three phase half-wave rectifier may be used depending upon the most economical application of tubes. Four pieces of equipment are involved. These are the power transformer, the electronic control, the control station and the direct-current motor.

Welding Clips

(*Concluded from Page 96*)

231 kilovolt-amperes. Some 15,300 amperes is applied for projection welding; electrode pressure is held at 300 pounds, with 10 cycles welding time. The secondary amperes are 30,600, but since the welds consist of two groups in series, each group having two projections in parallel, the current per projection is 15,300 amperes. Making the four welds in a series parallel connection instead of all in parallel has been found to just about halve the primary demand. See Table I for complete welding data—voltage data, impedance data, welding tests.

The secondary or welding circuit is arranged so one side of the transformer is connected through two independently spring-loaded and insulated electrodes to one half of the split clip. The current then goes through the projections into the shell base, across the base, back up through the other two projections in the second half of the clip and returns to the opposite transformer terminal through a second pair of independently insulated and spring-loaded electrodes. This makes a very efficient electric circuit as there is practically no loop and most of the impedance is due to the long water-cooled electrodes which must go up in the shell.

Develops Stripping Medium For Removing Varnish

A stripping medium, designated as Sterling S-159 Stripper, which provides fast and easy removal of insulating varnish from portions of electrical equipment where varnish is not desired, was developed recently by Sterling Varnish Co., Haysville, Pa.

Time of complete finishing of armatures, stators, rotors and other electrical units with insulating varnish is now measurably reduced with the use of the stripper. It eliminates the tedious and harmful scraping methods heretofore employed in removing varnish, it is said.

The development is a blue viscous liquid which is brushed on machined surfaces or other metal parts prior to the actual application of the varnish to the piece as a whole. It dries in two or three minutes after which the varnish is applied in the usual manner. Any varnish which adhered to the portions previously treated with the Stripper can be easily and rapidly removed.

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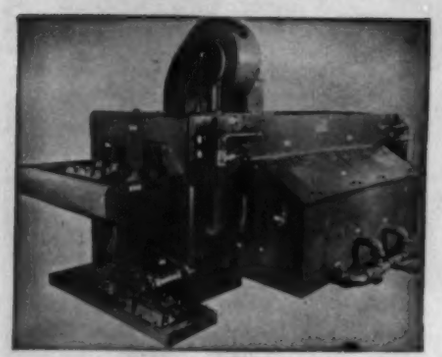
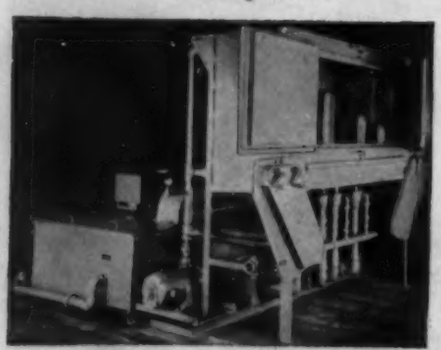
Shell Pickling Machine



Shell Washing Machine



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Mirrors of Motordom . . .

(*Continued from Page 80*)

ing power as the result of several years of national income well in excess of the 100-billion dollar level, together with depletion of available civilian goods.

A healthy condition or not, the dollars will be there to buy what industry can supply—so many dollars in fact that the government may be compelled to step in to ration, if you will, the purchase of new goods. Industry spots the economic suicide in trying to satisfy demands for goods all at once. Thus, a couple of 6,000,000 car years involving all-out new-record production to satisfy an impatient market, might so deplete and disrupt the ensuing years that the old cycle of depression and unemployment would be the inevitable result. There is general determination that this shall not happen again. But how to avoid it? Rationing of production and consumption appear the immediate recourse.

Throughout the motor industry there will be a host of new and well-equipped war production plants, owned by the government but of little use to it when the demand for military equipment has dwindled. The obvious answer is the absorption of such plants into the fabric of the motor industry and the dismantling and scrapping of older and more obsolete facilities. At least this is the expectation of the moment, though the details of how such absorption will be affected remain vague.

Try Rationalizing Future Economy

If you would like to give your imagination some setting-up exercises, see if you can rationalize an economy in which the government would retain title to all these new war plants and "lease" their operation on production of civilian goods to the present operators! And under strict limitations of wages, use of raw materials, price of product, extent of production, employment and related factors.

The automobile industry today comprises the so-called "big three"—General Motors, Chrysler and Ford; plus the independents — Studebaker, Packard, Nash, Willys, Hudson. In all, this represents 14 makes of passenger cars, a powerful condensation and distillation from the 1800-odd names which have streaked across the automotive sky in the past 40 years, most of them fizzling into oblivion. All these 14 will continue in a strong position by virtue of important war contracts, and they should be in excellent shape to resume output in the postwar period.

To these must be added the list of truck and bus manufacturers which likewise are in undisturbed position to resume production after the war.

It seems fairly certain now there will be newcomers in the automotive picture, and it will be a healthy eventuality. Logical entrants in the passenger car picture will be some of the leading interests now building aircraft. In fact, some of these companies are known to have motor car designs awaiting "the day". For them, the principal problem is not one of manufacturing, but rather one of distribution. The building of a dealership organization is no simple task, and to that the airplane companies must direct their principal efforts, while their competitors move quickly into the waiting market with established dealerships, among which there has been so far surprisingly low mortality.

Then there is the fabulous Henry J. Kaiser, who makes no bones about the fact he will move into the motor car market with a $400 car that is just going to knock the industry off its props. Already he is making overtures toward Detroit, but from those who have talked with the great West Coast maestro, the conclusion is inescapable that Kaiser knows virtually nothing about making or selling automobiles, but nevertheless he is well heeled with government money realized on war contracts and

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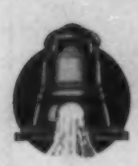

In the present war emergency, the service provided by Layne has been of inestimable value. Thousands of highly efficient well water systems for military, naval, munition and war material needs have been constructed in unbelievably short periods of time.

But over tomorrow's horizon—in the post-war period—there are new worlds to conquer. Municipal and industrial well water development projects now being held in abeyance to save war materials and manpower, will be rushed to completion.

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therefore is talking "big time stuff". Publicly the auto industry says it would welcome Kaiser as a new manufacturer of motor cars. Privately he is brushed aside as an industrial buffoon.

Here, then, is the picture as it appears in the midst of a war whose turn no one has yet called with any semblance of accuracy. But in a characteristic American way we look ahead to the rosy future before today's scores have been settled. If this be treason, then as Patrick Henry said in 1765, make the most of it.

Latin America . . .

(*Continued from Page 75*)

icals, cotton and woolen cloth, raw cotton, lard, vegetable oils and leather.

Ecuador is exporting shoes to Colombia; an order for 50,000 pairs was recently placed, with a value of over a million sucres. Colombia recently withdrew the duty on cocoa from Ecuador.

Ecuador now ships rice to Venezuela, Bolivia, Argentina and Cuba; 7000 tons were shipped to Cuba in January.

Trade between Venezuela and Brazil is growing. Brazil has shipped to Venezuela 6000 auto tires and tubes. Brazil has four large tire factories with surplus capacity—Firestone, Dunlap, Goodyear, and Brazil—while Venezuela has one factory which turns out 1200 tires a month. Venezuela will pay for the tires with crude and refined oil, and gasoline.

Caracas now has a new Brazilian-Venezuelan Chamber of Commerce as well as the Argentine-Venezuelan Chamber of Commerce following the signing of the trade agreements with these countries.

Argentina is sending cheese to Venezuela and auto tires to Colombia.

Colombia's purchases from its neighbors are up about 148 per cent over the prewar period. Costa Rica's exports to Argentina, Panama and Colombia are up to 386 per cent and its imports from Peru and Mexico are up 92 per cent.

A new orientation is indicated by the trade figures of Chile which show 38 per cent of the exports going to neighboring republics or more than double the prewar average. The imports from the neighboring republics also doubled in the same period.

Lack of transportation, according to business leaders of Chile, is the prime cause in retarding this promising increase in inter-American trade. The bananas of Ecuador, for example, find a ready market in Chile whenever ships can be found to transport them.

Chile, in the first nine months of 1942, achieved a favorable trade balance with an increase in value of exports over

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imports of 184,000,000 pesos, although the actual volume of exports showed a decline.

Peru, in the first nine months of 1942, tripled its exports to Chile supplying sugar, petroleum and cotton seed and, in the same period, Argentine exports to Chile of cattle and sheep and woolen cloth rose fifty per cent.

The same favorable trend is indicated by Chile's exports. Newspapers of Santiago hail these facts as proof of a growing hemisphere economic solidarity.

A recent study of trade possibilities between Argentina and Chile shows that Argentina can purchase to advantage from Chile many commodities which were formerly imported from countries with which Argentina has had an unfavorable trade balance. These commodities include hemp, coal, mercury, fine wines, iron, sulphur, lumber, oxide of iron, copper, fruits, vegetables, and nitrate for fertilizer of which Argentina can use large quantities. On the other hand Argentina can provide Chile with beef, tallow, canned meats, hides, leather, silk, vegetable oils, cheese, sugar, and butter.

Four Factors Hinder Trade

Factors which in the past have hindered this trade are: (1) lack of convenient routes of communication; (2) customs and administrative delays which impede a free flow of commerce; (3) lack of knowledge of each others markets; (4) lack of equilibrium in commercial balance.

The growing collaboration between leaders of the two nations, however, has caused petitions to be sent to the two governments for more highways and railways across the intervening ranges of the Andes. Argentine interests are urging the completion of the 500 mile Salta-Antofagasta railroad over the Sacompa Pass. The rails on the Argentine end have been pushed forward from Salta to Plotaoatos which is somewhat beyond San Antonio de los Cobres and is now about 114 miles from the Chilean border.

The three rich mining provinces of Chile—Atacama, Antofagasta and Terapaca—with a combined population of 325,000—offer a tempting potential market for the livestock, fruits, vegetables, butter, cheese, and wheat of northern Argentina, for these are desert provinces and all food except fish must be shipped in.

In Neuquen Province in southern Argentina, due west of the port of Bahia Blanca, a railroad has been carried as far west as Zapala or 86 miles from the Chilean frontier. This line when extended into Chile will cross the mountains at the Hachado Pass at an elevation of only about 5775 feet above sea level and will tap the region between Concepcion and Valdivia. Other passes farther north are over 12,000 feet.

The mines at Coronel and Lota, just south of Concepcion, can produce two million tons of high grade coal a year, and coal is one of the commodities that Argentina needs most.

Argentina's interchange with the American republics continues to expand on a large scale. In 1938, 34 per cent of Argentina's imports and 20 per cent of the exports were to the neighbor republics; today the figures are 65 per cent of imports and 51 per cent of exports.

According to the Argentine Chamber of Commerce, that nation's exports to the other Americas now exceed in dollar volume the trade lost to Europe while the imports from them make up, to a considerable extent, the imports lost from abroad. Argentine wheat is shipped to Brazil in exchange for textile, iron and lumber.

Argentine imports from the United States in the first nine months of 1942 totaled 339,120,000 pesos or 33.6 per cent of all imports. Approximately 17 per cent of its imports came from Brazil, 2.9 per cent from Chile and from Venezuela 2.7 per cent.

In the same period Argentina sent

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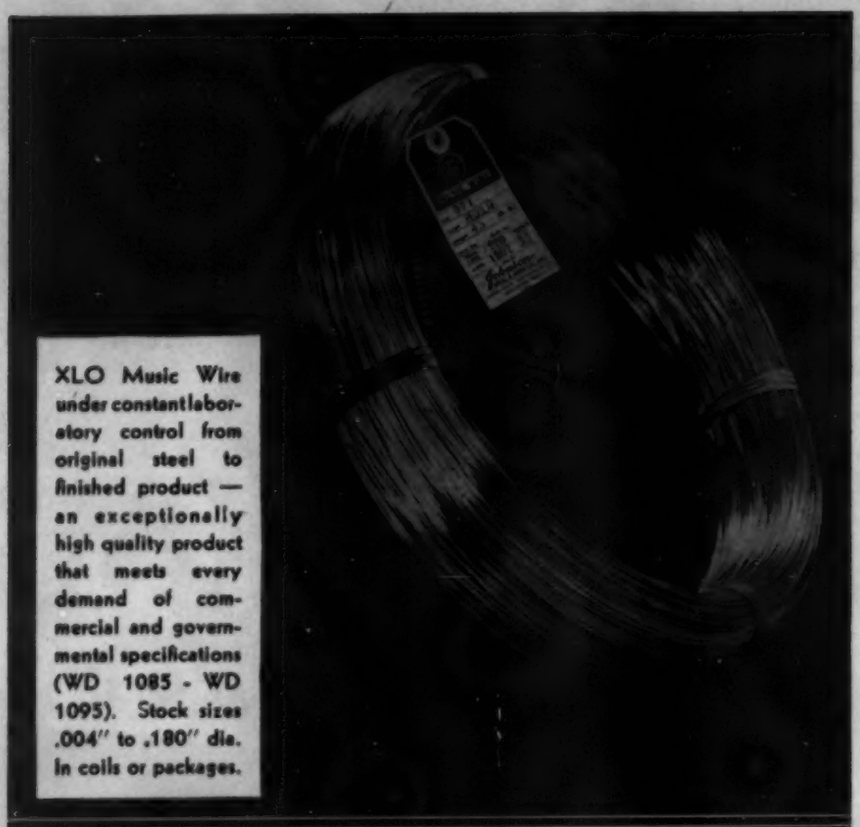
XLO Music Wire under constant laboratory control from original steel to finished product — an exceptionally high quality product that meets every demand of commercial and governmental specifications (WD 1085 - WD 1093). Stock sizes .004" to .180" dia. In coils or packages.
JOHNSON STEEL & WIRE CO., INC.
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IF ENGINE POWER IS NEEDED . . .

Here's Your Engine!

Machine designing engineers, contractors, farmers, oil operators and industrial users are more and more rcognizing the amazing versatility, heavy-duty dependability, fit-the-machine compactness, light weight and economy of WISCONSIN AIR-COOLED ENGINES. Specify these engines for *today's work* as well as for *tomorrow's* applications.

Power range: 1 to 35 hp., 1 and 4-cylinder types. Model VE-4, 22 hp., 4-cylinder V-type illustrated.

BUY BONDS FOR VICTORY

WISCONSIN Air-Cooled ENGINES

MOST POWER Per POUND

WISCONSIN MOTOR Corporation

MILWAUKEE, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

33.4 per cent of its exports to Great Britain, 30.6 per cent to the United States, 5.7 per cent to Brazil, three per cent to Chile, and two per cent to Bolivia and to Uruguay, and a little over one per cent to Peru, Paraguay and Colombia.

Regular shipments of manufactured goods and merchandise of Argentine origin are now being made by airplane to the other republics of South America. This method of shipping certain types of merchandise to the west coast cities is no more expensive, it is stated, than making shipments to the same points by steamer, taking into account the high insurance and freight rates imposed by the war. Planes make deliveries from Buenos Aires, Argentina, to Quito, Ecuador, in four days while a steamer would normally take from four to six weeks.

The first plane that flew the new diagonal route from Buenos Aires through Bolivia, Peru and Ecuador to Panama carried over a ton of air express containing among other things 210 dozen fine felt hats sent to a wholesaler in Ecuador.

Argentine merchants also are shipping medicines and pharmaceutical products, articles of glass, horn, and leather, toys, textiles, and knitted goods, stockings, movie films, eyeglasses, magazines, and even samples of cereals and food products by air.

Seek Mutual Co-operation

The Inter-American Development Commission, which furthers commercial exchange of all kinds between the American republics, believes that the channels of trade offer one of the most logical and direct avenues of mutual cooperation in bringing about better conditions in all the nations of the new world.

The physical means of communication between our republics—highways, airways, railways and communication by sea—are now being improved with rapid strides made in the construction of international highways and air lines. The Pan American Highway is like a spinal column for this growing system of international roads and the airlines spread their network across the map so rapidly that the picture changes from day to day.

Under the slogan "what helps one helps all" we are raising standards of living, and higher standards of living, in turn, create increasing demands and a growing exchange of goods.

Thus, each nation is making its contribution to the fight for a free world, for it is only by providing easy access to supplies and to markets that we can create a satisfactory world in which to live.

Definitely SUPERIOR!

HOT *and*
COLD ROLLED
STRIP STEEL
in
CARBON
and
ALLOY
ANALYSES
including
STAINLESS

SUPERIOR
STEEL CORPORATION
CARNEGIE
PENNSYLVANIA

MEETINGS . . .

Gear Association To Meet At Rye, N. Y., May 17-19

Preliminary program for the twenty-seventh annual meeting, American Gear Manufacturers' Association, Westchester Country Club, Rye, N. Y., May 17-19, follows:

Sunday, May 16

4:00 p.m.
Executive committee meeting

8:00 p.m.
General commercial committee meeting
General standards committee meeting

Monday, May 17

9:30 a.m.
Opening address by J. H. Flagg, president.
Reports of membership committee, treasurer and secretary

10:15 a.m.
Technical committee meetings, including worm gear, helical and herringbone, bevel, spur and planetary, fine pitch, aircraft, worm, gearmotor, production gears, mill gears, trade practice, government bureaus and labor relations committees.

1:00 p.m.
Luncheon

2:15 p.m.
"Gears and the "National War Effort" by R. C. Sollenberger, deputy chief, materials handling equipment branch, General Industrial Equipment Division, WPB.
Question and answer period on general scheduling order M-293, CMP and WPB.

3:45 p.m.
Technical committee meetings, including lubrication, tooth forms, inspection, gear materials and research committees.

6:30 p.m.
Dinner

8:30 p.m.
Technical committee meetings, including keyways and splines, gear sound and nomenclature and geometry committees.
Movies: "Chips", Warner & Swasey Co.; "Aluminum, Mine to Metal", "Aluminum Fabricating Processes", United States Bureau of Mines.

Tuesday, May 18

9:00 a.m.
Report of nominating committee.
"Proposed Method of Preparing and Editing AGMA Literature" by W. P. Schmitter, chief engineer, Falk Corp.
"Induction Hardening of Gear Teeth" by F. W. Curtis, chief engineer, Van Norman Machine Tool Co.
Report on shot blasting metallurgy.

12:15 p.m.
Luncheon

6:30 p.m.
Fellowship dinner

7:30 p.m.
Annual dinner
Introduction of new officers
Connell award presentation
"The Post-War America That America Does Not Want" by Dr. R. Alexander

Wednesday, May 19

9:30 a.m.
"AMGA Statistical Activities", by G. H. McBride, application manager, Westinghouse Electric & Mfg. Co.
"A Good Solution to One Transportation Difficulty" by G. Davenport, assistant chief engineer, Gould & Eberhardt
"This Renegotiating Problem". Speaker to be announced.
Committee reports, technical and commercial.

—o—

Association of Iron and Steel Engineers—Problems in the development of the steel expansion program by which steelmaking capac-

REMOVE SMUT FROM COLD ROLLED STEEL

FASTER with

OAKITE COMPOSITION No. 90

A NEW, basically different material that has been developed specifically to meet today's urgent wartime need for greater SPEED and THOROUGHNESS in anodic degreasing of cold rolled steel parts before electroplating, Oakite Composition No. 90 gives you these SIX important advantages:

SPEEDIER REMOVAL of smut, oil, grease, buffing and drawing compounds

FASTER wetting-out action

MINIMIZES and controls foaming in automatic cleaning and plating equipment

SPECIAL emulsifying properties that provide greater mineral oil tolerance

LONGER solution life

MORE UNIFORM results that assure smoother-running production

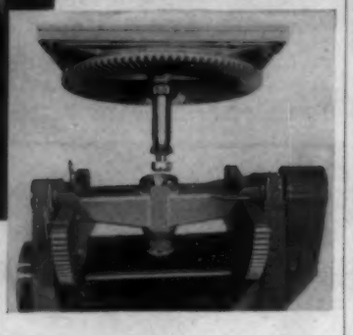
Get the Complete Story!

Let us demonstrate how this superior material can expedite your reverse current cleaning operations . . . help you increase output and reduce rejects! Write today for full information. There's no obligation, of course.

OAKITE PRODUCTS, INC.
341 Thames Street, New York, N. Y.
Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized cleaning*
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

SMOOTH ACCURATE ROTATION



. . . Another Ransome feature for faster and better welding

Indicative of the correct design and trouble-free construction of Ransome Welding Positioners is the use of two Timken Tapered Roller Bearings on the main spindle shaft.

With these bearings, the shaft is kept in perfect alignment . . . particularly important in maintaining a true circular path when using automatic welding heads on circular work.

Another advantage is that the grease-packed Timken Bearings require a minimum of attention.

Base frames, table tops, and table supporting yokes, on all Ransome Positioners, are of heavy welded construction. Hand-operated and motor-operated types . . . capacities up to 20 tons. ***Write for literature.***

Ransome WELDING POSITIONERS

INDUSTRIAL DIVISION • RANSOME MACHINERY COMPANY • DUNELLEN, NEW JERSEY

Modern industry has no place for "jack-of-all-trades" steel sheets. Every steel sheet is a specialty, its properties designed for a definite class of duties. That's why Continental produces sheets in a wide range of specifications and with over thirty different types of surface treatments, finishes and coatings.

CONTINENTAL STEEL CORP., Kokomo, Indiana

The Superior Sheet Steel Co., Canton, Ohio—a subsidiary

CONTINENTAL SUPERIOR STEEL

CONTINENTAL STEEL CORPORATION

PRODUCERS OF—SHEETS: Black, Galvanized, Copperior, Hot and Cold Rolled, Special Coated, Long Terne, etc. WIRE: Bright Basic, Annealed, KONIK, Coppered, Tinned, Special Manufacturer's, etc.

ity is being expanded by more than 9,000,000 tons, will be discussed by H. G. Batcheller, Director of Iron and Steel Division, WPB, at the annual spring conference, William Penn hotel, Pittsburgh, May 10. Other speakers at the conference, sponsored by the rolling mill committee of the association, include: J. Sparks, Swindell-Dressler Corp.; R. Wright, Westinghouse Electric & Mfg. Co.; H. H. Talbot, United Engineering & Foundry Co.; A. Montgomery and J. B. Holbrook, Carnegie-Illinois Steel Corp.; and O. A. Bamberger, Republic Steel Corp.

American Mining Congress—F. V. Harper, deputy chairman, War Manpower Commission, Washington, will outline the personnel situation in the coal industry, Cincinnati, May 17-18. Activities and progress of our armed forces will be described by Col. R. Ginsburgh, War Department, Washington. Other discussions will center around operating problems, labor conservation programs, haulage, maintenance, coal preparation and safety.

Metalworking Advisory Committees Appointed

Industry advisory committees have been established in WPB for the following metalworking industries:

Tractors Industry Advisory Committee

Government presiding officer is K. W. Anderson. Committee members: W. L. Clark, J. I. Case Co., Racine, Wis.; R. W. Hautzenroeder, The Fate-Root-Heath Co., Plymouth, O.; R. A. Keck, Keck-Gonnerman Co., Mt. Vernon, Ind.; R. M. Kyes, Harry Ferguson Inc., Dearborn, Mich.; J. L. McCaffrey, International Harvester Co., Chicago; A. W. Newby, Huber Mfg. Co. Inc., Marion, O.; Merle S. Tucker, Oliver Farm Equipment Co., Chicago; P. H. Noland, B. F. Avery & Sons Co., Louisville, Ky.; A. W. Petterson, Thieman Harvester Co. Inc., Albert City, Iowa; W. A. Roberts, Allis-Chalmers Mfg. Co., Milwaukee; E. F. Schiele, Massey-Harris Co., Racine, Wis.; Frank Silloway, Deere & Co., Moline, Ill.; W. B. Taylor, Minneapolis-Moline Power Implement Co., Minneapolis; J. R. Love, Love Tractor Inc., Eau Claire, Mich.

Electric Fence Controllers

Government presiding officer is James W. Crofoot. Committee members: A. J. Benson, Electronic Specialties Co., Chicago; W. C. Best, The Prime Mfg. Co., Milwaukee; A. K. Knudsen, Sampsel Time Control Inc., Spring Valley, Ill.; E. K. Malme, Guard-It Mfg. Co., Chicago; E. D. Nunn, Northern Signal Co. Inc., Milwaukee; E. H. Pratt, Accessories Mfg. Co., Chicago; J. L. Sheerin, Kingston Products Corp., Kokomo, Ind.; M. S. Turner, Parker-McCrory Mfg. Co., Kansas City, Mo.

Chicago Museum Foundry Makes Battleship Parts

Iron foundry at the Museum of Science and Industry, Chicago, started a war career recently. Originally designed only for exhibit purposes, the foundry now operates five days a week producing war castings at the rate of several hundred pounds a day. Complete operation is visible to the public and explanatory demonstrations are given.

One of the first orders which the museum is filling is for a small part weighing less than 2 pounds which will be used in making battleship parts. Wartime demands often make it inexpedient to interrupt volume production in commercial plants for small though essential orders. These are the types best suited to the museum foundry.

Many Quarterly Reports Show Earnings Off Slightly

(*Concluded from Page 66*)

$162,000; in corresponding 1942 period, these taxes totaled $625,000.

Pittsburgh Steel Co.

Pittsburgh Steel Co., Pittsburgh, earned first quarter net profit of approximately $600,000, after federal income and excess profits taxes and other charges, equivalent to $3.65 a share on the three classes of preferred stock. This compares with $645,334, equal to $4.01 a share, at the close of the 1942 quarter.

Pittsburgh Coke & Iron Co.

Pittsburgh Coke & Iron Co., Pittsburgh, reports net income for first quarter as $152,311, after $161,150 for federal and state income taxes. Net amount is equal to 20 cents a common share, compared with 17 cents a share on net profit of $133,172 for comparable 1942 period.

Continental Steel Corp.

Consolidated net income of Continental Steel Corp., Kokomo, Ind., for the quarter ended March 31 was $118,159, equal to 50 cents a share on common stock, compared with $169,337, or 68 cents a share, for corresponding 1942 quarter. Provision for federal income and excess profits taxes for the three months totaled $138,000 against $378,200 in prior year. Net sales amounted to $5,402,302 in the latest period, decrease of $843,457 from year ago.

Interlake Iron Corp.

Consolidated net profit of Interlake Iron Corp., Chicago, for the first quarter amounted to $260,429, against $444,762 in like 1942 period. Federal and state income and excess profits taxes in latest quarter totaled $446,000, compared with $598,000 the year before. Net sales to March 31 aggregated $9,973,897, against $9,951,615 in corresponding 1942 quarter.

Cleveland-Cliffs Iron Co.

Cleveland-Cliffs Iron Co., Cleveland, showed first quarter net, after federal taxes, of $274,723, equal to 56 cents a share on preferred stock. This contrasts with $327,199, or 67 cents a share on preferred, at March 31, 1942.

Climax Molybdenum Co.

Three month net profit of Climax Molybdenum Co., New York, totaled $2,714,272, after all charges, but before provision for depletion of discovered increment and credit for postwar refund in excess profits taxes amounting to $198,542. Provision for federal income and excess profits taxes was $2,887,231. Net is equivalent to $1.08 per share and compares with $2,048,892, or 81 cents a share, in like period last year.

M. A. Hanna Co.

Consolidated net income of M. A. Hanna Co., Cleveland, for the first quarter after all charges, including provision of $673,710 for federal taxes, was $854,056. This is equal after preferred dividends to 68 cents a share on 1,016,961 common shares and compares with $804,858, or 63 cents a share, in 1942. Tax provision last year was $173,221.

Keystone Steel & Wire Co.

Keystone Steel & Wire Co., Peoria, Ill., reports net profit for first quarter as $220,854, or 29 cents a share, compared with $364,083, or 48 cents a share, for quarter ended March 31, 1942. Results for nine months operations to March 31 showed net profit of $677,785 against $1,130,496 in previous year.

Cliffs Corp.

Net income of $177,220 was reported by Cliffs Corp., Cleveland, for three months ended March 31, against $250,072 for like period a year ago. Per share earnings in the most recent period were 22 cents, compared with 31 cents for first quarter, 1942.

International Nickel Co. Inc.

Report of International Nickel Co. Inc., Toronto, for 1942 shows net profit as $33,301,829, after all charges, compared with $34,356,401 in 1941. Capital expenditures in the latest period were $12,009,497 for a program to increase output of nickel in all forms by 50,000,000 pounds per annum over the 1940 production rate.

Crucible Steel Co. of America

March quarter net income totaled $1,915,905, after provision of $10,706,642 for federal and state income and excess profits taxes, equal to $3.39 per common share. In first quarter last year net income, with provision for taxes computed on same basis as for 1943 period, was $1,676,044, after reserve of $7,482,498 for taxes on income, or $2.84 on common stock.

Carpenter Steel Co.

Report of Carpenter Steel Co., Reading, Pa., for first quarter shows net income as $362,054, after federal taxes and provision of $400,000 for postwar contingencies and adjustment of inventories, equal to $1 a share. In comparable 1942 period company earned $626,777, or $1.74 a share.

Wheeling Steel Corp.

Net profit of $961,391 was reported by Wheeling Steel Corp., Wheeling, W. Va., for its first quarter 1943 operations, equal after preferred dividend requirements, to 89 cents a share on the common stock. In comparable 1942 period, net was reported as $1,200,090, or $1.31 a common share. Federal income taxes for the period amounted to $569,000 and excess profits tax to $1,089,000, comparing with $1,010,000 and $1,615,000, respectively, in the first quarter of 1942.

Republic Steel Corp.

Republic Steel Corp. reported consolidated net income for the first quarter of $6,666,557 after all charges, including estimated income and excess profits taxes. A provision for federal income and excess profits taxes of $17,450,000 was made for the quarter. Consolidated net income for the first quarter of 1942 was $4,716,692.

Midland Steel Products Co.

Net earnings of Midland Steel Products Company for the first quarter amounted to $379,797 after all charges, including provision for federal taxes on income and for general contingencies. This compares with net earnings of $176,073 for the first quarter of 1942.

Blaw-Knox First Quarter War Output Up 170 Per Cent

Volume of war output of Blaw-Knox Co., Pittsburgh, in the first quarter this year increased about 170 per cent over first quarter, 1942, William P. Witherow, president, told stockholders at company's annual meeting. He reported net profit for first quarter, 1943, as $409,764, or 31 cents a share, compared with $276,624, or 21 cents, for the corresponding 1942 period. Net was after all charges, including $200,000 reserve for war and postwar adjustments.

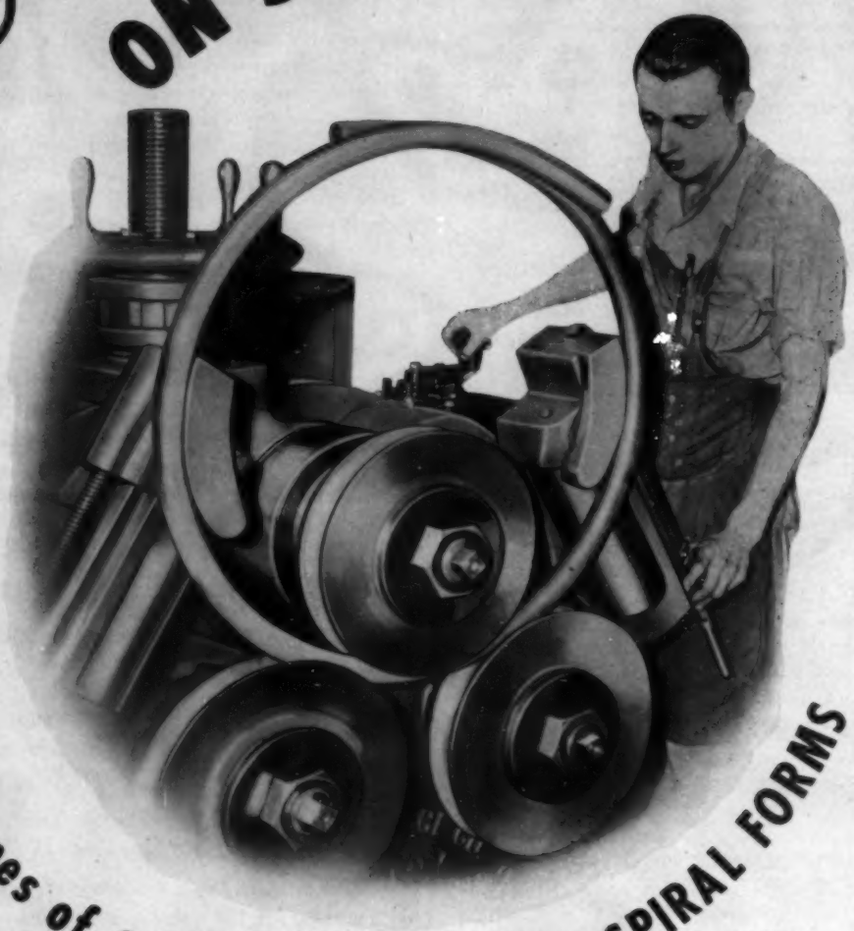
Foundry Equipment Sales Index Rises in March

Foundry Equipment Manufacturers' Association, Cleveland, reports index of net orders closed on new equipment in March was 538.6, compared with 348.1 in February and 394.9 in January.

Total sales index was 562.7 in March, 399.5 in February and 429.8 in January. Index for repairs in March was 635.2, in February 554.4 and in January 534.9.

Indexes are percentages of monthly averages of sales to metalworking industries, 1937-1939.

Bending ON SCHEDULE



all types of CIRCLE, SEGMENT AND SPIRAL FORMS

A GLANCE to the left shows the wide range of stock which can be handled rapidly and *accurately* by a Buffalo Bending Roll—and explains why metal bending output need never lag! Even unskilled labor can be put on these husky, easy-to-control machines, with full confidence that schedules will be met, and with a minimum of rejects. Full engineering data on Buffalo Bending Rolls for aircraft and general fabricating applications will be sent promptly on request. In writing, please state the size, shape and material to be handled.

BUFFALO FORGE COMPANY

158 Mortimer St. **Buffalo, N. Y.**

CANADIAN BLOWER & FORGE CO., LTD., KITCHENER, ONT.

ARMY E NAVY

"Buffalo" BENDING ROLLS

Second Quarter Capacity Covered by CMP Orders

DEMAND
Extends into third quarter.

PRODUCTION
Up ½-point to 99½ per cent.

PRICES
Steady at ceilings.

Some current buying for July, August delivery and beyond. . . Pig iron situation eases further. . . Scrap supply provides some reserve accumulation. . . Iron ore in slow start

LITTLE steel is available for delivery before July for buyers not already covered by CMP numbers. An occasional lot may be worked into schedules but this would be the rare exception.

Conversion from Production Requirements Plan to Controlled Materials Plan is practically complete and much tonnage which failed to be validated by CMP has been cancelled, clearing mill books of many orders on which delivery was remote and practically impossible. Most material originally booked under PRP was converted to the new plan and in spite of cancellations producers have all the business they can handle, though order books are in better condition for economical scheduling. While some directives still are necessary the new plan requires fewer than formerly.

Narrow cold strip orders have been heavy in recent weeks and many producers have filled third quarter production quotas, some orders being booked for fourth quarter. Directive quotas limit backlogs and some orders have been refused. Difficulty is experienced in formulating balanced operating schedules. Indications are that steel strip is being used more widely for war purposes in place of copper.

• • •

The steel sheet situation is tightening, with mill schedules filled to midyear in most cases, some CMP tonnage going over into July. Galvanized sheets, recently available for second quarter delivery, now are difficult to obtain earlier than third quarter.

Not only is steel and iron scrap being delivered in better volume but quality has improved on the average, with more heavy material to offset the preponderance of light grades, which have been difficult to use economically. Turnings continue a problem and are not being used as rapidly as produced, backing up in the hands of dealers and producers in many instances. While scrap supply is enough for current steelmaking needs not much progress is being made in accumulating reserves, though some tonnage is being laid down for future use. A project in New England by Steel Recovery Corp. involves about 25,000 tons of street railway rails.

The wire industry is well engaged, largely in specialties, many of which require much time for processing, aircraft demand being notably heavy. Some tonnage scheduled for April delivery has been pushed over into May because of late validation under CMP. Forward buying into third and fourth quarter is being done, mainly in products for which claimant agency requirements are well stabilized, such as bullet cores. After being one of the tightest of wire products for many months nails are beginning to ease slightly.

Demand for carbon steel bars is less active, especially in small and medium sizes, but most mills are booked solidly for the remainder of second quarter and in some cases can offer little before late July. In larger rounds and flats late August is the best offered by some producers. Cold-drawn bars are difficult to obtain before August, alloy bars are promised for September and some orders are being offered for fourth quarter, the latter including material requiring special processing.

• • •

Various pig iron consumers find their position easing considerably from that of the past few months and many are in possession of better inventory than for some time. This has resulted from lessened demand for some lines of castings from gray iron shops, including those for machine tool and mill equipment manufacturers. Malleable and steel foundries are most active but pressure for shipment of iron is less. Some dislocation has resulted from blast furnaces going down for relining, melters being supplied from different sources than usual in the meantime.

Imminence of a bituminous coal strike finds the steel industry with an average of 30 days supply of fuel, though some units have only enough for ten days. A continued mine stoppage would bring progressive shutdowns as supplies become exhausted.

Steelmaking last week gained ½-point to 99½ per cent of capacity, with few changes in the various districts. Pittsburgh advanced 2½ points to 101 per cent, Chicago ½-point to 99 and Wheeling 4½ points to 93. Cincinnati registered the only decline, losing 6 points to 91 per cent. The remaining districts held the rates of the preceding week unchanged; as follows: Buffalo, 93; St. Louis, 93; Cleveland, 95; Youngstown, 95; eastern Pennsylvania, 94; Birmingham, 100; New England, 95; Detroit, 96.

Controlled by OPA ceilings composite prices of steel and iron products are unchanged at the level of the past several months. Finished steel composite is $56.73, semi-finished steel $36, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	May 1	Apr. 24	Apr. 17	One Month Ago Apr., 1943	Three Months Ago Feb., 1943	One Year Ago May, 1942	Five Years Ago May, 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.00
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	23.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	11.60

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	May 1, 1943	April, 1943	Feb., 1943	May, 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.49
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron	May 1, 1943	April, 1943	Feb., 1943	May, 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.39
No. 2 fdry., del. Pitts., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.265
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.54
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	140.65

Scrap				
Heavy melting steel, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$6.50	$6.50	$6.40	$6.00
Connellsville, foundry, ovens	7.75	7.75	7.50	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.58c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box $4.50.

Tin Mill Black Plate. Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.35c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.

(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill, Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and Cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	⅝	30	10
½	63½	51	1-1¼	34	16
¾	60½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2¾"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	28.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., .fo.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	.....	‡‡18.00	19.00	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. ‡‡Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

⅛ x 6 and smaller	65½ off
Do., ⅞ and ⅜ x 6-in. and shorter	63½ off
Do., ½ to 1 x 6-in. and shorter	61 off
1¼ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	35 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

	U.S.S.	S.A.E.
Semifinished hex.	62	64
⅞-inch and less	59	60
1-1-inch	57	58
1⅛-1½-inch	56	..
1⅝ and larger		

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*6.50
Connellsville, foundry	7.50- 8.00
Connellsville prem. fdry.	7.75- 8.10
New River, foundry	8.50- 8.75
Wise county, foundry	8.00
Wise county, furnace	7.00

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.50
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943.
†$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	†24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	†24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.75	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston, del.	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
§Pittsburgh, del. No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $28.00
Chicago, del. 31.54

(For higher silicon irons a differential over and above the price of base grades is charged as well as ...ad chilling irons, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Islands, Pa. $23.50
Neville Island, Pa. $23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpeville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00

Second Quality

Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.30
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem bonded chrome	54.60
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, ‡135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon, per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 8-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents up.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

Borosil: 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 9100 series
Boston	4.075[1]	3.933[1]	3.933[1]	5.758[1]	3.805[1]	4.137[1]	5.137[1]	5.255[14]	4.775[14]	4.175[21]	4.725	7.783[25]	6.083[25]
New York	3.884[1]	3.778[1]	3.788[1]	5.605[1]	3.611[1]	4.005[1]	4.005[1]	5.031[13]	4.644[14]	4.134[21]	4.805	7.600[25]	5.900[25]
Jersey City	3.884[1]	3.758[1]	3.788[1]	5.605[1]	3.611[1]	4.005[1]	4.005[1]	5.031[13]	4.644[14]	4.134[21]	4.805	.	.
Philadelphia	3.843[1]	3.677[1]	3.615[1]	5.293[1]	3.536[1]	3.943[1]	4.293[1]	5.038[13]	4.893[13]	4.093[21]	4.793	7.577[25]	5.877[25]
Baltimore	3.833[1]	3.780[1]	3.605[1]	5.283[1]	3.405[1]	3.933[1]	4.283[1]	4.905[1]	4.883[13]	4.083[21]	....	....	....
Washington, D. C.	3.95[1]	3.80[1]	3.80[1]	5.35[1]	3.60[1]	4.10[1]	4.45[1]	5.15[17]	5.10[20]	4.03[21]	..	.	.
Norfolk, Va.	4.096[1]	4.022[1]	3.991[1]	5.496[1]	3.791[1]	4.196[1]	4.546[1]	5.391[17]	4.996[24]	4.196[21]	....	....	....
Bethlehem, Pa.*	....	3.45[1]	..	....	....	....	.	.	....	....	.	.	.
Claymont, Del.*	....	....	3.45[1]	....	....	....	.	.	....	....	....	..	..
Contesville, Pa.*	....	....	3.45[1]	....	....	....	.	.	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[13]	4.30[13]	3.75[21]	3.52	7.35[25]	5.65[25]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[13]	4.20[13]	3.65[21]	....	....	....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.00[24]	3.65[21]	.. .	7.45[25]	5.75[25]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.00[13]	3.65[21]	.	.	.
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[13]	4.05[24]	3.75[21]	3.20	7.55[25]	5.85[25]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[13]	3.95[24]	3.65[21]	..	.	.
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[13]	4.30[24]	3.80[21]	3.40	7.67[25]	5.97[25]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[13]	4.77[24]	4.42[21]	....	.	..
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[13]	4.77[24]	4.42[21]	..	.	.
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[13]	4.37[24]	4.00[21]	3.45	7.69[25]	5.99[25]
Youngstown, O.*	....	....	....	....	.	.	.	4.40[13]	.. .	....	..	.	.
Middletown, O.*	..	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.40[13]	..	..	..	.	.
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[13]	4.10[24]	3.75[21]	3.50	7.35[25]	5.65[25]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[13]	4.00[24]	3.65[21]	.	.	.
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[13]	4.23[24]	3.88[21]	3.54	7.58[25]	5.88[25]
St. Paul	3.75[1]	3.80[1]	3.80[1]	5.40[1]	3.50[1]	3.85[1]	3.85[1]	5.00[1]	4.35[1]	4.34[21]	3.83	7.70[25]	6.00[25]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[13]	4.24[24]	4.02[21]	3.61	7.72[25]	6.02[25]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[13]	4.25[24]	3.97[21]	..	.	.
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[13]	4.00[24]	3.97[21]	..	.	.
Memphis, Tenn.	3.90[1]	3.95[1]	3.95[1]	5.71[1]	3.85[1]	4.10[1]	4.10[1]	5.25[13]	4.66[24]	4.31[21]	....	....	....
Birmingham (city)	3.50[1]	3.55[1]	3.55[1]	5.83[1]	3.45[1]	3.70[1]	3.70[1]	4.75[13]	4.78[24]	4.43[21]	..	..	..
Birmingham (country)	3.40[1]	3.45[1]	3.45[1]	5.83[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.78[24]	4.43[21]	..	..	..
New Orleans (city)	4.10[1]	3.90[1]	3.90[1]	5.85[1]	3.95[1]	4.20[1]	4.20[1]	5.25[13]	4.95[13]	4.60[21]	3.90	.	.
New Orleans (country)	4.00[1]	3.80[1]	3.80[1]	5.75[1]	3.85[1]	4.10[1]	4.10[1]	5.15[13]	4.95[13]	4.60[21]	.	.	.
Houston, Tex.	3.75[1]	4.25[1]	4.25[1]	5.50[1]	3.75[1]	4.50[1]	4.30[1]	5.25[13]	5.45[13]	4.50[21]	..	.	.
Los Angeles	4.35[1]	4.60[1]	4.90[1]	7.15[1]	4.95[1]	4.90[1]	6.70[1]	5.95[13]	7.15[1]	5.70[21]	..	9.55[25]	8.55[25]
San Francisco (city)	3.95[1]	4.35[1]	4.65[1]	6.35[1]	4.55[1]	4.50[1]	4.50[1]	6.60[13]	7.55[13]	5.55[21]	..	9.80[25]	8.80[25]
San Francisco (country)	3.85[1]	4.25[1]	4.55[1]	6.25[1]	4.45[1]	4.40[1]	4.40[1]	6.50[13]	7.45[13]	5.45[21]	..	.	.
Tacoma	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.25[1]	5.45[1]	5.70[1]	6.63[13]	5.75[21]	..	..	.
Seattle (city)	4.20[1]	4.45[1]	4.75[1]	6.50[1]	4.65[1]	4.35[1]	5.45[1]	5.70[1]	6.63[13]	5.75[21]	....	..	8.00[25]

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendments Nos. 10 and 14 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore
Gross ton, 51½%
Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50

less $7 freight allowance

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars. New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.3c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.5c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	.	.
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.	.30-.40	.90	18.00	1.40	28.00
NE 8613	.12-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.18-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9253	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	.	.
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	.	.
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9537	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c. per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

	ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES													
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†17.35	12.85	13.85	14.85										
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

LOGEMANN
Presses for Sheet Scrap

THE NATION NEEDS YOUR SHEET SCRAP!

In mills, industrial plants and scrap yards, LOGEMANN SCRAP PRESSES are working day and night to prepare sheet scrap for the furnaces.

Sheet mills particularly recognize the value of the years of experience and the performance records which back up LOGEMANN designs and workmanship.

The line includes scrap presses *designed for mill Service,* presses *designed for automobile plant conditions,* presses *designed for general plant applications.* Write for details.

The scrap press illustrated operates in one of the largest industrial plants. Compresses scrap from three directions to produce high-density mill size bundles. Built in various capacities.

LOGEMANN BROTHERS COMPANY
3126 W. Burleigh St. **Milwaukee, Wisconsin**

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 210) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

Secondary Aluminum: All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99⅛% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (96-97⅛%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

Antimony: American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $15 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

Indium: 99.5%, $10 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y., 44.75c per ounce.

Platinum: $36 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 26.65c, 85% 28.86c.

Copper Wire: Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.30c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu; 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400-lb. bbls. 39.00c f.o.b. Graselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

Scrap Metals

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze 90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil., 5%	9.250	9.000	4.625
Phos. br., A. B. 5%	11.00	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.00c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

Sheets, Strip . . .

Sheet & Strip Prices, Page 154

Sheet demand continues relatively quiet. Such buying as is noted is now almost without exception for delivery beyond June 30, as mills are booked up tightly on most grades for the current quarter. In certain specialties, such as electrical sheets, a little tonnage may still be available for shipment in this period, but it is the exception. Even galvanized sheets, which were available for second quarter delivery at some mills a week ago, can no longer be had before next quarter, it now appears.

Much of the activity at present, according to some sellers, is the validating of tonnage under CMP for July, which mills advise they cannot get out for May and June shipment. One large producer found himself out of the market on both May and June tonnage at about the same time. In cases where consumers had been unable to get shipments at the time desired, as noted above, it is believed that most have sufficient inventories to carry them until shipment can be made. These consumers usually tried other mills upon being turned down by the producer first approached, but apparently had no great success, as the others usually were booked up also.

Heavy flood of narrow cold strip orders has filled third quarter production quotas at some mills and fabricators are also placing fourth quarter tonnage and beyond. Producers, limited by directive quotas, are turning down orders and experience difficulty in balancing bookings for smooth operating schedules. Much incoming tonnage requires two or three annealings. More steel is being allotted than mill directives cover, in the opinion of some producers; at least numerous consumers are given heavier tonnage than in the recent past.

There are indications that steel is being bought in heavier volume to replace brass for more war uses. PRP tonnage which has not been validated to CMP has been written off, but most former orders were converted. Shipments are maintained, but rerollers are confronted by a tightening manpower problem.

Plates . . .

Plate Prices, Page 155

In the experience of some steel plate producers applications for June rollings fell noticeably short of capacity and they attribute this in part to a desire by consumers to reduce inventories further as CMP becomes generally applied. They believe, however, that as June approaches they will be allocated tonnage on applications to other mills whose capacity may be more heavily taxed.

Some such relief may be provided strip plate producers so that they may be able to handle their mounting backlog of sheet orders. One large producer now making considerable strip plate is booked up solidly through August on hot-rolled sheets, with a good proportion on allocation numbers issued through a civilian supply agency.

Eastern plate producers report only a relatively few 298 forms are sprinkled through applications for June rolling and that these marked the end for these forms as CMP allotment numbers will be required from now on.

Bars . . .

Bar Prices, Page 154

Carbon bar demand is less active than a few weeks ago, especially for small and medium sizes. However, producers appear to be booked up solidly for the remainder of this quarter and in some cases have little to offer before late July. This is particularly true of large rounds and flats, some mills having little left before the latter part of August. Cold-drawn carbon bars are now difficult to obtain before August. Alloy bar promises fall principally in September. Orders for alloy bars are also noted for fourth quarter. This is particularly the case where special treatment is required.

Consumers who have been drawing on warehouses to piece out their needs for heat treated bars apparently soon will have to make different arrangements because of the WPB ruling prohibiting mills from supplying jobbers with such tonnage beyond that now in course of processing. Not only is the ruling now in effect but distributors who specialize in this material have relatively light stocks.

Already some consumers have been confronted with the problem and have been advised by Washington that it is understood they are to buy the hot-rolled bars and have them processed by local companies who do heat treating. However, some have had difficulty finding such companies with equipment adequate for meeting their needs. They

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also find that charges usually are higher because of the varied nature of the work of many of these shops. Considerable heat treating business already has been placed on books. The order covers normalizing, quenching and drawing but not annealing.

Wire . . .

Wire Prices, Page 155

Mills are heavily booked on certain specialties, but holdups on lend-lease tonnage have eased some fine wire products, such as music wire. Strong demand for tempered brush wire extends deliveries to 22 weeks; requirements are heavy for cleaning operations, notably in the aircraft industry, and valve spring and other wires entering into aircraft, much of it chromium-vanadium. Makers of small springs require much high-quality specialty wire, including alloys.

Rope mills are booked several months ahead with supplies of wire ample to maintain deliveries in most instances. Heavy galvanized is tight, one New England mill rebuilding a galvanizing unit which will not be in operation for several months.

Because some late CMP orders and validated PRP tonnage were certified late in the month, considerable tonnage scheduled for April delivery will not be shipped until late May. Some forward buying is developing under CMP for third and fourth quarter delivery. This is confined mostly to products scheduled for more or less static requirement or where the war program under the claimant agency allows assured stabilized demand over a longer period. This applies to considerable extent to bullet core steel, demand for which is heavy.

Due to long-processing required, some finishing departments are heavily loaded while others have open gaps in capacity. For the first time in months demand for nails is beginning to ease. On the whole, rod distribution is well spread, but some integrated mills complain they are losing tonnage needed in their own finishing departments.

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Rails, Cars . . .

Track Material Prices, Page 155

Domestic freight car buying of 1000 units in April brought awards for the first four months up to 8765, compared with 22,183 in the corresponding period of last year, 43,396 in the same period of 1941 and 6688 in the first four months of 1940. April buying consisted of the purchase by the Norfolk & Western of 1000 seventy-ton composite hoppers, previously noted as being divided equally between Virginia Bridge Co., Roanoke, Va., and the Bethlehem Steel Co., Bethlehem, Pa., subject to Washington approval. Further comparisons follow:

	1943	1942	1941	1940
Jan.	7,415	4,253	15,169	360
Feb.	350	11,725	5,508	1,147
March	0	4,080	8,074	3,104
April	1,000	2,125	14,645	2,077
4 mos.	8,765	22,183	43,396	6,688
May		822	18,630	2,010
June		0	32,749	7,475
July		1,025	6,459	5,846
Aug.		0	2,668	7,525
Sept.		1,863	4,470	9,735
Oct.		0	2,499	12,195
Nov.		0	2,222	8,234
Dec.		135	8,406	7,181
Total		26,028	121,499	66,889

Defense Plant Corp. has closed on 1200 special type troop sleeping cars to the Pullman-Standard Car Mfg. Co., Chicago, and has 400 kitchen cars still pending.

Structural Shapes . . .

Structural Shape Prices, Page 155

Shipments of fabricated structural steel for March showed a slight increase over the first two months of 1943, according to reports to the American Institute of Steel Construction. March shipments totaled 111,606 net tons, compared with 106,262 tons in February and 106,615 tons in January. Bookings in March were 37,170 tons, compared with 33,350 tons in February and 58,684 tons in January. For three months shipments were 324,483 tons, compared with 523,614 tons in the corresponding period in 1942. Bookings for three months were 129,204 tons, compared with 660,394 in first quarter last year.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 155

Demand for bolts and nuts continues heavy, particularly from shipyards, and also in important degree for various lend-lease projects. Considerable tonnage is going to Russia, it is understood. While the tank construction program has tap-

ered, quite a tonnage is moving in this direction. On the ordinary run of bolts and nuts, deliveries are available within six to eight weeks and on galvanized ten to twelve weeks. The wooden shipbuilding program is drawing heavily on galvanized bolts and nuts. Various dry dock projects also require considerable galvanized tonnage.

Pig Iron . . .

Pig Iron Prices, Page 156

Pig iron consumers report a cut in May quotas from some sellers, due to blast furnaces being down for repairs. Producers who have suspended were allowed to build up stocks a bit in advance, it is said, but not in sufficient amount to carry through the period of reduced operations. Another factor in reduced allocations in some cases has been a tapering in the foundry melt, with a subsequent increase in inventories.

Consumers of charcoal iron in at least several cases were given no tonnage for May. However, in the case of this grade the reduction in tonnage has been due primarily, if not entirely, to reduced production. This trend set in several weeks ago, due to lack of charcoal, and is expected to become more pronounced before there is change for the better.

An important Buffalo stack which has been down for repairs is expected to be in blast again not later than May 5.

American Rolling Mill Co. has started operations in its new heavy castings foundry at Middletown, O., which will be devoted to war work. The foundry was built at the suggestion of the War Production Board.

While melt of foundry pig iron in New England is declining, tonnage allocated to the Everett furnace for May delivery will force that unit to draw on reserves in addition to its current output. Nevertheless, requirements of numerous gray iron shops are definitely downward, with the outlook dimmed by curtailment of several mill equipment industries, restricted to repairs, maintenance, and little new volume; included are textile, paper mill and to some degree the shoe machinery industries. Demand for castings by machine tool shops is slackening; some jobbing foundries are seeking orders. The load on the Everett furnace this month therefore is due to restricted shipments from two New York furnaces, normally supplying part of the tonnage each month, now down for repairs. There is little decline in requirements for basic and malleable, but in many cases pressure for shipment is less and inventories are in better balance, although the latter are held within 45 days.

Scrap . . .

Scrap Prices, Page 158

Except for difficulty in obtaining manpower for scrap yards the situation is much better, steel mills being served sufficient tonnage for the high rate of production, some being able to lay down material in reserves. Quality also averages better than in the recent past, more heavy grades being delivered. Government agencies continue the work of uncovering dormant scrap and industrial plants are being combed to obtain further unused equipment.

In the Chicago area the situation is distinctly better, in spite of continued labor shortage. One important melter is receiving more than it is consuming and is adding to its reserves. This interest is utilizing an unusually high percentage of loose turnings and borings, said to be about 25 per cent of its scrap mixture. Scrap flow is better from all sources and quality is improved.

Including allocations, movement of open-hearth scrap in New England is heavier than cast grades, but buying is not brisk, with consumers reluctant to pay the Boston rate differential of 99 cents per ton. Some sub-ceiling prices are also paid for scrap taking higher freights. Short turnings, mixed borings and stove plate sell to blast furnaces but turnings are piling up with numerous producers. Low phos steel scrap supply is ample, notably plate shearings. Gray iron foundries, confronted by a decline in orders, have ample inventories as a rule and are not buying. No. 1 machinery is about the only cast grade in demand. Malleable and steel foundries, the most active in the castings field, also have substantial reserves, although some buying continues. Steel Recovery Corp., successor to War Materials Inc., will supervise recovery of close to 25,000 tons of street railway rails. Up to now most rails recovered have been allocated to Pennsylvania steel foundries.

St. Louis district melters find quality improving as larger proportion is re-

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ceived from railroads and industrial plants. Steel mills have comfortable inventory and some additions have been made recently. Labor still is scarce.

Iron Ore . . .

Iron Ore Prices, Page 157

About 1,000,000 gross tons of iron ore was loaded into vessels up to May 1, in sharp contrast with 8,581,740 tons in like 1942 season.

Despite the late start this year and the fact that ice conditions are still hampering navigation, vessel interests are confident that the record movement of 95,000,000 tons set for the 1943 season will be reached. Regulation of trip time per vessel in respect to hauling of coal back up to northern ports, promptness with which the United States Maritime Commission ore carriers can be brought into service and weather conditions late this fall will be the determining factors.

Late last week a number of loaded vessels were temporarily stalled in the ice above the Soo canal. The first ore carrier to pass through the Soo to lower lake docks was the COLONEL of the Cleveland-Cliffs Iron Co.'s line. This vessel arrived at Cleveland Wednesday of last week, the first vessel to load ore at Marquette, Mich. The Pittsburgh Steamship Co.'s vessels the HARVEY, TAYLOR, POE and SHIRAS were the first vessels loaded at Two Harbors and Duluth, to pass through the Soo on the downward trip. They arrived at Conneaut and Ashtabula last Thursday. Ice situation in Buffalo harbor had bottled up some 40 vessels at that point most of last week.

All the 306 ore carriers in the great lakes fleet have been placed in commission. To help reach the record shipment goal set for this year a number of Canadian vessels are expected to again be brought into the ore trade. In addition to these, the 16 ore carriers being built by the Maritime Commission are scheduled to be placed in service. Those companies negotiating for these vessels are reported to be: Pittsburgh Steamship Co., 3; Interlake Steamship Co., 3; Cleveland-Cliffs Iron Co., 3; Great Lakes Steamship Co., 2; Hutchinson & Co., 2; Wilson Transit Co., 1; Reiss Steamship Co., 1; and Waterways Navigation Co., 1. None of the companies have yet completed negotiations for these vessels. Due to the delay in construction it will be May 15 before any will be placed in the ore trade. Only eight are expected to be in service by July 1.

Warehouse . . .

Warehouse Prices, Page 157

WPB is expected soon to issue a directive to mills limiting production of cold-finished steel for warehouses to certain specified sizes.

This move to standardize output is not expected to have much effect on steel distributors' buying policies for they have already accomplished much on their own initiative in eliminating odd sizes and have reduced sizes of cold-finished bars by about 25 per cent. Another practice has been purchase of bars in mill lengths, then cutting to order.

With production schedules fairly well determined for the remainder of this year, some manufacturers seek to place orders with distributors for later delivery. In most instances orders of this character are being turned down, as warehouses are unwilling to commit themselves on sizes which they have no guarantee they will have in stock at that time.

For second quarter distributors can accept carbon steel deliveries from mills up to 83 per cent of their base quota, as authorized under CMPL-85. Mill shipments during July will be one-third the tonnage sold by warehouses during first quarter. Shipments in Augut will replace tonnage sold during April, and September shipments will replace May sales, etc.

Warehouses can build up inventories through unlimited purchase of frozen inventories, on those items for which they have quotas.

Steel in Europe . . .

London — (*By Radio*) — Demand for steel and iron in Great Britain is heavy, especially for alloys and special steels and plates for armaments, locomotives and tank construction. Supplies of semifinished steel are increasing substantially. Deliveries of scrap are being maintained at a level that supports capacity steel production.

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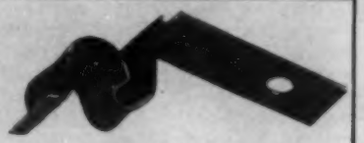

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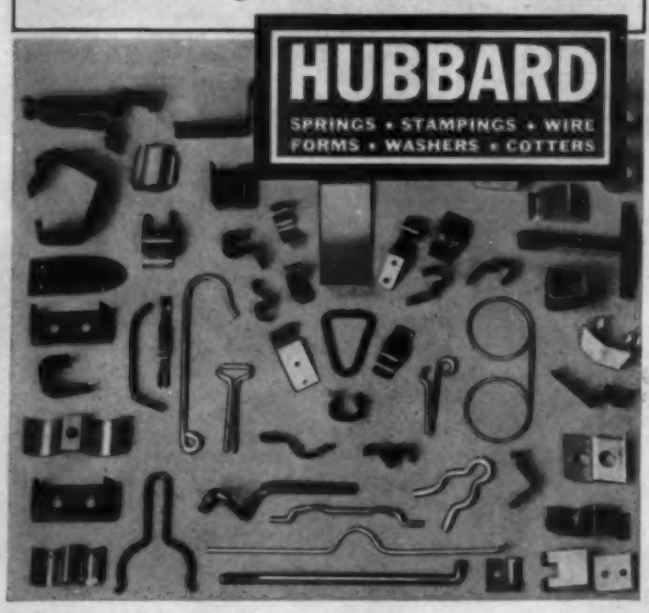

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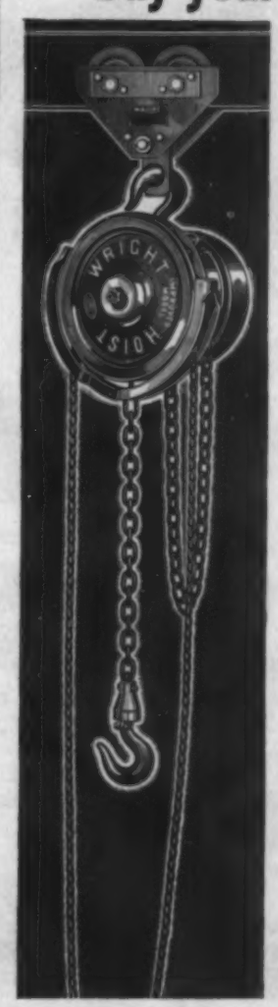

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Canada . . .

Toronto, Ont.—Buying in the Canadian steel markets is developing on a broader scale with the object of assuring supply of raw materials for the new phase of the war production program. Most of the new buying is in heavier lines and individual orders much larger than formerly. While Canadian mills are booked almost solid to the end of June, backlogs are steadily piling up and substantial commitments are reported into third quarter. While announcements have been made in government circles to the effect that some munitions production will be curtailed, so far there has been no slowing in demand for steel from small arms and gun producing plants. Steel production that was under curtailment at the early part of the year, due to labor troubles and necessary equipment repairs, is again at virtual capacity with some rolling departments producing well in excess of rated capacity.

Recent buying has strongly favored materials required for the enlarged shipbuilding program, to which have been added substantial tonnages of steel for rolling stock and locomotive builders and marine boiler makers. Big orders for plate have been poured into the market with the result that Canadian plate mills are now completely booked for an indefinite period, and there is a large overflow to the United States for early delivery. One leading Canadian plate producer was forced to turn down a large tonnage order for plate in the past few days pointing out that there was no chance of making delivery. However, mills are filling all urgent demands under direction of the steel controller and deliveries are being made in each order as to keep the more important war industries supplied.

While there was some easing in demand for black and galvanized sheets in the past week or ten days, mills are fully booked for this quarter, and curtailment in fresh buying is no indication of reduced consumption. Deliveries of sheets to non-war users are being held to a minimum although supplies still are being made available to essential stove and electrical equipment makers, as well as limited tonnages to steel barrel producers.

Sales of carbon and alloy bars were active and while some producers have small quantities available for delivery in June they refuse to commit themselves as to actual delivery dates. Bar supply is said to be keeping pace with war demands, but no large surplus stocks have been established either by producer or consumer. Mills are carrying large backlogs of non-war orders for bars and are accepting new business of this nature, but are not promising delivery at any specified time.

Merchant pig iron sales developed more action during the week, reaching a total in excess of 12,000 tons. Heavier buying is reported from agricultural implement makers as well as from foundries that are unable to get delivery of urgently needed scrap. Sales for the week featured malleable iron, and it is reported that one Canadian producer that had been out of the market for some time made shipments to a couple of merchant melters during the past few days. Demand for basic iron continues small and spotty.

Equipment . . .

Boston—Continued excess of shipments over new orders is steadily reducing backlogs and improving deliveries by the machine tool industry. Operations are becoming increasingly affected; night shifts have been taken off at a few shops; others are exploring possibilities for war material contracts and parts outside regular lines. Several have taken such contracts, including a large unit at Bridgeport, Conn. There is a moderate curtailment in subcontracting as tool builders are recalling or retaining work formerly let out in volume, to keep their own plants active.

Some shops have five months backlog yet, but improved deliveries on the more standard tools indicate a more rapid reduction; numerous types of lathes are now promised in 90 days. Scattered cancellations and diversions frequently make standard machines available in two or three weeks, although this is due to unforeseen circumstances as a rule. Lend-lease orders have improved materially and with scattered domestic volume, new orders for the industry are about half as many as shipments. Demand for metal fabricating machinery is by no means static, however, and will

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not be, at least for the duration. Volume of new orders now being taken would have been considered substantial in the lean 30's, but with greatly increased capacity now available, coupled with heavy buying in the last three years, the decline in demand is emphasized.

War Council Urges Unity To Bring Early Victory

(*Continued from Page 64*)

"In the second place, those fountainheads are the right to free and open competition between individuals and between groups under strict rules of fair play. We have mastered the art of mass production. It now remains for us to master the art of mass distribution, so that the products of our magnificent industrial machine may be ever more widely spread among all our people. To absorb that tremendous output, business and labor and agriculture must co-operate to maintain full employment, high wages, and maximum purchasing power.

"Only the wilfully blind can fail to see that the old-style capitalism of a primitive freebooting period is gone forever. The capitalism of complete laissez-faire, which thrived on low wages and maximum profits for minimum turnover, which rejected collective bargaining and fought against justified public regulation of the competitive process, is a thing of the past. Those who would turn back the clock of history in this respect are as unrealistic in their way as the addle-brained paper planners of our economic salvation."

Production on some items of warfare is in excess of immediate requirements, said Lieut. Gen. Brehon B. Somervell, commanding, Army Service Forces, adding he wished there were more such spots in the war production program. Reasons other than lack of planning account for curves in production. General Somervell cited this instance: One major lend-lease customer recently withdrew a substantial requirement for tanks, a change in the military situation making it desirable for that nation to devote more shipping to other equipment, particularly in the transportation field. This unforeseen and unforeseeable change in requirements necessitated a substantial change in production lines.

Production in the ammunition field of certain types and calibers, has enabled the Army to build up a reserve.

Although constant changes of war will undoubtedly cause minor readjustments, General Somervell believes production schedules for the Army supply for the remainder of 1943 may be reasonably stable.

Still Need Much Equipment

Despite rumors, there have been no large accumulations of stores, arms or ammunition in America in excess of ability to transport these supplies overseas, General Somervell declared, adding the Services of Supply are still not free from difficulties in providing essential cargo for the shipping which is available. Actually equipment has been withdrawn from troops in training to meet overseas requirements.

General Somervell congratulated industry for its war effort, saying the contribution of business has been magnificent in 17 months, producing and delivering the largest amount of the finest weapons in history.

Cutbacks in potential production schedules for 1943 found the Army with a few facilities underway to meet some schedules which were no longer necessary. Out of 90 facilities involved in this change of program, General Somervell said, 84 have been restored to use and all but five of these to full time for other parts of the program.

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and about 19 per cent in 1944. The remainder is designed to meet maintenance and operational requirements and as more and more troops take the field operational requirements will increase at a substantial rate.

Citing the gasoline container as an example of an operational requirement, General Somervell said 30,000 tons of steel are required each month for containers and requirements will increase throughout the war as larger air and ground units come in contact with the enemy. As the armies move into new areas, substantial materials will be needed for lines of communication to include pipe lines, rail equipment and larger truck and trailer units; also there will be need to rehabilitate public utilities to meet military requirements.

Study Indicates Postwar Era of Great Prosperity

(*Concluded from Page* 71)

demand for more than they can produce.

Three major contributions to the problem of measuring the postwar market opportunities for the individual enterprise are offered in the booklet. One of these is the national income statement showing the relation between the gross national product, the net national income, and the disposable income of individuals. This income statement provides a means of expressing the postwar possibilities for the nation as a whole.

The second contribution is an analysis of the cyclical fluctuations in the output of 77 groups of commodities and services relative to the gross national product since 1929. This analysis covers only end products at their cost to the ultimate consumer, and many industries will not find the information in convenient form. However, it provides valuable raw material for analysis of postwar markets.

Disclaiming any attempt to forecast a breakdown of the gross national product, the study presents a hypothetical projection for a postwar year. This is in terms of full utilization of available manpower and the 1942 price level.

A third exhibit intended to aid market planners is the presentation of case histories showing how individual concerns have tackled the problem of what a high national production and income would mean to them. These include Armstrong Cork Co., Lancaster, Pa., American Rolling Mill Co., Middletown, O., and two anonymous concerns.

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SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-16-22129: New York City company seeks facilities for making 2500 each of turnbuckle eyes and turnbuckle forks. Equipment required, ½-inch hand screw machine.

S-16-21993: Massachusetts manufacturer seeks subcontractor to make welded indicator case of 3/32-inch sheet aluminum alloy, dimensions approximately 10 x 17 x 17 inches. Quantity, 500. Welding.

S-16-21960: Michigan concern is in need of a subcontractor to make aircraft turnbuckle sleeves. Equipment required, automatic screw machines, B & S No. 0, Gridley No. F; also thread rolling machines and drills for secondary operations. Material, hexagonal steel AISI No. 61-No. 4037, supplied by prime contractor. There are seven screw pieces. Quantity, 100,000 to 200,000 per month of each piece.

S-16-21951: Pennsylvania engine manufacturer wants subcontractor to make cylinder heads and barrels. Job covers machining of cylinder heads and barrels as well as assembling these units, with insertion of valve seats, which are furnished by the prime contractor. Quantities, 10,900 cylinder heads and 2750 barrels.

S-16-21581: Cleveland, O., manufacturer seeks subcontractor who can machine aluminum forged fittings of various sizes, 9/16-inch the largest. Equipment, Potter & Johnson, New Britain or Goss & Deleuw automatic lathes.

S-16-22136: A procurement office seeks available hours for manufacture of molds and dies by both glass and plastic molding companies. Only concerns in a position to make own dies and molds in own shops will be considered. It is essential that prospective subcontractors should submit list of machine tools, specifying size, age and make of machine.

S-16-22151: Subcontractor wanted for manufacture of roller chains, .375-inch pitch. Quantity, 10,224 feet cadmium plated needed at once, 4300 to 8600 feet per month thereafter. Specifications, AN-QQ-P-421.

Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:

Buescher-16-1: A government agency requires 360 vacuum pump drive shafts. Deliveries, 60 per month, starting May, 1943. Dimensions, bevel gear 1.417-inch P.D., shaft length 5⅜-inch, diameter ⅞-inch. Tolerances, gears .002 to .005-inch when rolling with mating master; surfaces and P.D. of gears and splines must be concentric, flat, parallel and square to each tooth within .002 full indicator reading. All material will be furnished.

Buescher-16-2: A government agency requires 380 fuel pump drive gears. Deliveries to start in May, 1943. Dimensions, bevel gears 2-inch P. D.; shaft length 1.745-inch; diameter, .759-inch, plus or minus .002. Tolerances, gears .002 to .006-inch backlash when rolling with mating master; surfaces and pitch diameter of gears must run true with each other within .002. All material will be furnished.

Buescher-16-3: A government agency requires 340 impeller shafts. Deliveries to start in June, 1943, at 60 per month. Dimensions, spur gears 1.5 P.D.; shaft length 5.58-inch; diameter .7873 plus .0003. Tolerances, gears .001 to .004 when rolling with mating master gear; surfaces, spline, P.D. of gear and threads must be concentric, parallel and true to each other within .003 to .002 full indicator reading. All material will be furnished.

Buescher-16-4: A government agency requires 649 shaft accessory drives. Deliveries 60 per month, starting in June, 1943. Dimensions, bevel gear 1.6-inch P.D.; shaft length 6 25/64-inches; diameter .738-inch plus or minus .0005. All material furnished.

Buescher-16-5: A government agency requires 272 starter shafts. Deliveries, 60 per month starting in June, 1943. Dimensions, spur gear 3.6-inch P.D.; shaft length, 5.283-inch; diameter 1.3735-inch minus .001. Tolerance, gears .002 to .006 when rolling with mating master gear. All material furnished.

Buescher-16-6: A government agency requires 395 crankshaft gears. Deliveries, 60 per month starting in June. Dimensions, spur gear 3.143-inch P.D.; width .88-inch; 20 degree stub tooth form, 36 teeth 7/9 pitch. Tolerance, gear .006 to .010 backlash when rolling with mating master. All material furnished.

Buescher-16-7: A government agency requires 340 gear and pinion impeller drive. Deliveries 60 per month starting in June. Dimensions of small spur gears, 20 degree stub tooth form, 18 teeth 7/9 pitch, 1.857 P.D. Width .626-inch, .004 to .008-inch backlash when rolling with mating master gear. All material furnished.

Buescher-16-8: A government agency requires 938 tachometer and fuel pump drive shafts. Deliveries 80 per month starting in May. Dimensions, bevel gear 1.8-inch P.D.; shaft length 6.219 inches; diameter .7485 minus .001. Tolerances, gears .002 to .006-inch backlash when rolling with mating master. All material furnished.

Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:

Job No. 5642: Cylinder head. Quantity 1250 per month. Castings furnished. Equipment, multimatic or turret lathe, turret lathe, automatic lathe, lathe, internal grinder, grinder, sensitive drill, external thread grinder, magnaflux.

Job No. 5663: Bushing. Quantity, 3000 to 5000. Material, SAE 1112 steel. Equipment, hand screw machine, surface grinder. Dimensions, 37/64-inch O.D. x 29/64-inch long. Tolerance, plus or minus .0015.

Job No. 5669: Sunshade. Quantity 4400. Brass tubing furnished. Equipment, hand screw machine, spinning lathe. Dimensions, 1½-inch O.D. x 3 3/32-inch long.

Job No. 5673: Outlet connection. Quantity, 4000. A-137 B steel furnished. Equipment, hand screw machine, cadmium plate. Dimensions, 1½-inch hex x 2 3/16-inch long. Tolerance, plus or minus .0018.

Job No. 5735: Centerwire screw. Quantity, 50,000 per day for three months. Material, steel. Equipment, automatic screw machine. Dimensions, .1718 O.D. x 1 33/64-inch long. Tolerance, plus or minus .001.

Job No. 5737: Nut. Quantity 30,000 per month. Material, AMS-4630 bronze, furnished. Equipment, automatic screw machine, horizontal mill, lead screw tapper. Dimensions, 1½-inch O.D. x 11/16-inch long. Tolerance, plus or minus .001, 40 prof.

Job No. 5744: Nut. Quantity, 135,000 per month. Material, AMS 5024 steel, which is furnished. Equipment, automatic screw machine, horizontal mill, lead screw tapper. Dimensions, 29/64-inch hex x 5/16-inch long. Tolerance, plus or minus .0012, 50 prof.

Job No. 5756: Axis bolt. Quantity, 5000. Material, NE8739 steel, which is furnished. Equipment, hand screw machine, lathe, centerless grinder. Dimensions, ⅝-inch O.D. Tolerance, plus or minus .0004.

Job No. 5830. Firing pin. Quantity, 200,000. Material, brass rod. Equipment, automatic screw machine. Dimensions, 45/64 O.D. x 15/32-inch long. Tolerance, plus or minus .0025.

Job No. 5832: Detonator holder. Quantity, 200,000. Material, WD X1314 steel. Equipment, automatic screw machine, cadmium plate. Dimensions, 11/16 O.D. x 13/32-inch long. Tolerance, plus .003.

Job No. 5837: Fuel pump shaft. Quantity, 11,000. Material, monel rod, which is furnished. Equipment, hand screw machine, external grinder. Dimensions, ½-inch O.D. x 4⅞-inch long. Tolerance, minus .001.

Job No. 5841: Piston ring. Quantity, 11,000. Material, aluminum rod, which is furnished. Equipment, hand screw machine, external grinder, sensitive drill. Dimensions, 1¾-inch O.D. x 7/32-inch thick. Tolerance, minus .0005.

Job No. 5919: Gear. Quantity, 15,000. Material, stainless steel. Equipment, screw machine, surface grinder, gear hobber, screw machine, sensitive drill. Dimensions, 1½-inch O.D. x 1/16-inch thick. Tolerance, plus or minus .007.

Job No. 5922: Clutch sleeve. Quantity. 15,000. Material, cast iron, Equipment, turret lathe, external grinder. Dimensions, 15/16-inch O.D. x 3/16-inch thick. Tolerance plus or minus .0005.

Job No. 5923: Adjusting screw. Quantity, 60,000. Material, cold-rolled steel. Equipment, automatic screw machine, hand mill, cadmium plate. Dimensions, ¼-inch O.D. x 7/16-inch long.

Job No. 5926: Lock ring. Quantity, 15,000. Material, Armco ingot iron. Equipment, turret lathe, sensitive drill, cadmium plate. Dimensions, 1 3/16-inch O.D. x ⅛-inch thick. Tolerance, plus or minus .001.

Job No. 5670: Sleeve. Quantity, 5500. Material, brass, which is furnished. Equipment, automatic or hand screw machine. Dimensions, 1 5/32-inch O.D. x 1¼-inch long.

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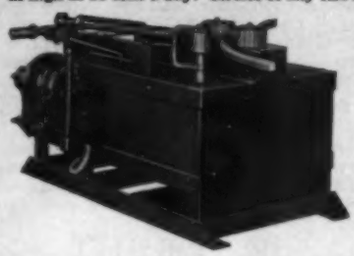

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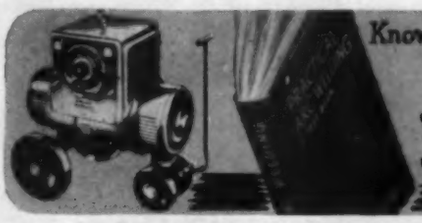

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CONSTRUCTION AND ENTERPRISE

OHIO

AKRON, O.—Lehr Ornamental Iron & Welding Works, 545 Grant & 628 Washington streets, is planning to erect shop building at 545 Grant street when priority is granted by WPB.

BEDFORD, O.—Bedford Tool & Forge Co., has been incorporated to manufacture tools and metal products. Incorporators are Marie McClullough and Thresa Tonka. Agent, Leo J. Kucera, Bedford Savings & Loan building, Bedford, O.

CLEVELAND—Victory Mfg. & Tool Co., L. M. Evans, 4810 Prospect avenue, will convert 2000 square feet of second floor for light machine shop.

CLEVELAND—Charles Smith & Son Inc., A. L. Kopanski, president-treasurer, 2130 St. Clair avenue, is converting 66 x 130-foot area for heavy machine shop.

CLEVELAND—General Motors Corp., Cleveland Diesel engine division, L. W. Bauman, plant engineer, 2160 West 106th street, will erect two-story, 60 x 140-foot service and office building at Clinton road.

CLEVELAND—Ohio Sheet Metal Die Co. has been incorporated to manufacture and deal in sheet metal and dies by Hirsh and Nathan C. Bachner and Morton C. Mandell, 505 N. B. C. building, also agent.

CLEVELAND—Allied Plating Corp., John Hallack, president, 277 East 156th street, will construct one-story, 60 x 120-foot factory to cost $40,000. George Colcher, 369 East 200th street, contractor.

CLEVELAND—Pearl Machine & Tool Co., newly incorporated, has been organized by Harry G. Whitford, agent, 5847 Edgehill drive, John D. Slagor and V. M. Hefferman, attorney, Leader building, to do general machine work and manufacture steel castings.

CONNECTICUT

STAMFORD, CONN.—Union Industries Inc., 275 Fairfield avenue, has plans by D. Mansell, 24 Park Row, for boiler plant.

STRATFORD, CONN.—Vought-Sikorsky Division, United Aircraft Corp., 550 Main street, will build helicopter plane plant, extend and alter two factory units, South avenue, to cost $500,000. Edwin Moss & Son. Inc., 555 Grant street, Bridgeport, Conn., contractors.

NEW YORK

LONG ISLAND CITY, N. Y.—Dowty Equipment Corp., 41-28 Thirty-seventh street, will expand and improve facilities to increase aircraft equipment output.

MICHIGAN

DETROIT—Gray Marine Motor Co., 710 Canton avenue, will build one-story, 60 x 200-foot plant addition to cost approximately $60,000. Smith, Hinchman & Grylls, 800 Marquette building, have plans.

MARYLAND

BALTIMORE—Gross Mechanical Laboratories will erect storage shed. Davis Construction Co., 9 West Chase street, contractor.

BALTIMORE—Glenn L. Martin Co., Middle River, Md., contemplates erection of a one-story, 120 x 600-foot warehouse.

BALTIMORE—Revere Copper & Brass Inc. has started two additions to its tube plant at 1300 Wicomico street.

BALTIMORE—American Brake Shoe & Foundry Co. plan alteration to plant, 2001 Laurens street. Contract awarded to Baltimore Contractors, 15 North Central avenue.

BALTIMORE—Bendix Radio Division, Bendix Aviation Corp., Towson, Md., has leased for maufacturing purposes 20,000 square feet in the Steiff building, Lafayette avenue and Aiken street.

BALTIMORE—Westinghouse Electric & Mfg. Co. has awarded contract to Consolidated Engineering Co. Inc., 20 East Franklin street, for addition to manufacturing building at 4015 Foster avenue.

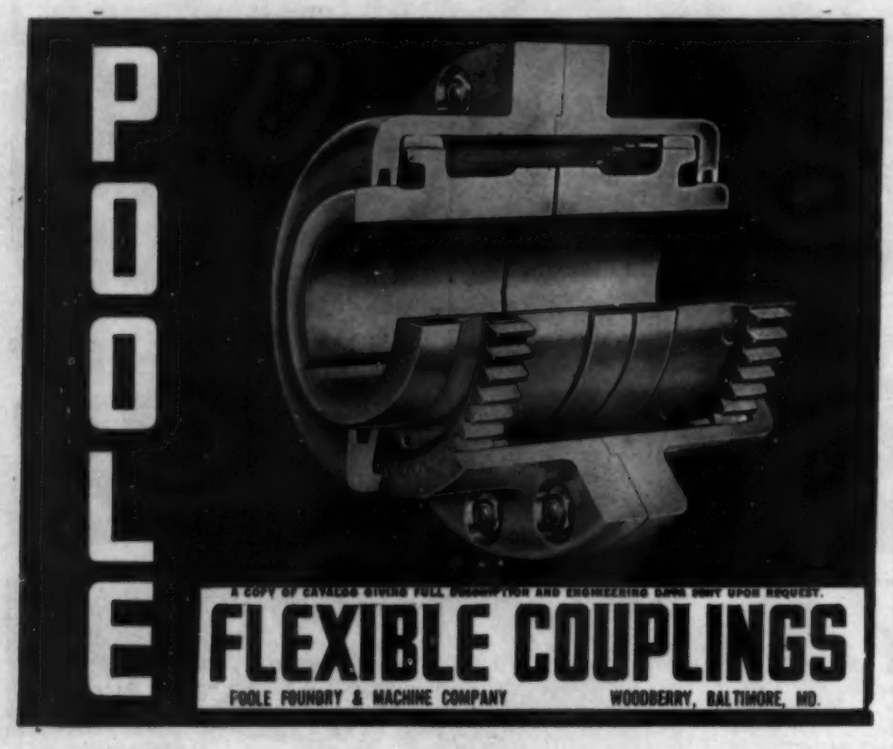
MISSOURI

ST. LOUIS—Scullin Steel Co., 6700 Manchester avenue, has been awarded contract by Defense Plant Corp. for additional plant facilities.

ST. LOUIS—Mines Equipment Co., 4215 Clayton avenue, has permit for one-story, 100 x 121-foot factory at 4235 Clayton avenue. Woermann Construction Co., 3800 West Pine boulevard, general contractor.

ST. LOUIS—Paraseal Corp., subsidiary of Mines Equipment Co., has acquired 60,000 square feet additional industrial property west of present plant at 4215 Clayton avenue.

ST. LOUIS—H. & H. Machine & Motor Parts Co., 4216 West Easton avenue, has let con-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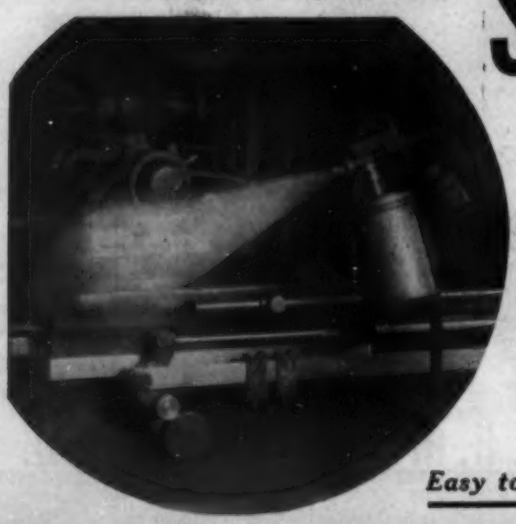

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tract to Saum Architects, 713½ Chestnut street, to erect one-story, 18 x 71-foot machine shop to cost $6000.

WISCONSIN

CAMBRIDGE, WIS.—Melster Candies Inc. will build one-story, 32 x 40-foot boiler house and one-story, 21 x 50-foot factory addition. Law, Law & Potter, 1 South Pickney street, Madison, Wis., architects.

IOWA

NEWTON, IOWA—Maytag Co. has plans by Proudfoot, Rawson, Brooks & Borg, 815 Hubbell building, Des Moines, Iowa, for additional one-story, 120 x 189-foot factory building to cost $100,000, including equipment.

WEBSTER CITY, IOWA—McCulloch's Inc. has awarded general contract for rebuilding factory to Zitterell-Mills Co. Cost to exceed $40,000, with equipment.

NEVADA

RENO, NEVADA—Molybdenum Products Co., E. George Howe, superintendent, 244 West First street, plans construction of quicksilver plant in Humboldt county.

CALIFORNIA

ALHAMBRA, CALIF.—C. F. Braun & Co., 1000 S. Fremont avenue, will build 70 x 228-foot steel, corrugated iron factory addition, costing $54,000. Owner builds.

LOS ANGELES—Atlas Galvanizing Co., 4636 Pacific boulevard, will construct plant addition to cost $8000.

LOS ANGELES—Western Galvanizing Co., 2701 South Soto street, will erect factory building to cost $5900.

LOS ANGELES—Allied Air Parts has been formed by John Calvin Nutter to conduct business at 8162 Melrose avenue.

LOS ANGELES—Beigay Machine Co., has been formed by Otto F. Beigay and Ben Brown to conduct business at 5214 Atlantic boulevard.

LOS ANGELES—Columbia Automatic Screw Machine Products Co., 7401 Sunset boulevard, has been formed by George R. Medlin and William J. Buell.

LOS ANGELES—Atlantic Screw Machine Co., 800 East Gage street, has been formed by Arthur A. Anderson, Ernest M. Carlson, Martha Anderson and Esther Carlson.

LOS ANGELES—Universal Machine & Tool Co., 2416 South San Pedro street, has been formed by Henry B. Friedman.

LOS ANGELES—Acme Metal Die & Stencil Works has been formed by H. N. Brown and Martin Weber to conduct business at 212 East Seventeenth street.

ROSEMEAD, CALIF.—Tuttle Tool & Mfg. Co. has been formed by Ralph W. Tuttle to conduct business at 1740 Bentel avenue.

SUNNYVALE, CALIF. — Ames Aeronautical Laboratory, National Advisory Committee for Aeronautics, Moffett Field, near Sunnyvale, will construct new high-pressure wind tunnel to cost approximately $3,500,000. Pittsburgh-Des Moines Steel Co., Rialto building, San Francisco, contractor.

OREGON

PORTLAND, OREG.—Pacific Chain & Mfg. Co., 1901 Northwest Wilson street, has been authorized by Defense Plant Corp. to construct adjoining plant to cost $200,000.

WASHINGTON

SEATTLE—Puget Sound Power & Light Co., 612 West Forty-fifth street, will install oil tanks, pumphouse and other improvements. Stone & Webster Engineering Corp., contractor.

CANADA

NORTH VANCOUVER, B. C.—North Vancouver Ship Repair Co., 171 West Esplanade, is building additional offices and other plant facilities.

OTTAWA, ONT.—Ontario Hughes-Owen Co. Ltd., 200 Sussex street, will build factory to cost $75,000.

SAULT STE. MARIE, ONT.—Algoma Steel Corp., Wilde avenue, will build boiler house addition to cost $60,000. McLarty & Hanna, 173 Spring street, contractors.

TORONTO, ONT.—Aluminum Co. of Canada, Sun Life building, Montreal, Que., plans by J. C. Meadowcraft, 1154 Beaver Hall Hill, Montreal, Que., will build two-story building, 158 Sterling road, to cost $115,000 with equipment.

LACHINE, QUE.—Cartier Chemical Co. Ltd. will build plant addition costing $40,000.

MONTREAL, QUE.—Johnson Wire Works Ltd., 4760 Dagenais street, has given general contract to A. F. Byers Construction Co. Ltd., 1226 University street, and let other subtrades, in connection with plant addition to cost $15,000. T. Pringle & Son Ltd., 485 McGill street, engineer.

MONTREAL, QUE.—Canadian Vickers Ltd., Maisonneuve, has called bids for plant addition, including one-story addition to machine shop to cost about $50,000. Plans by J. Cecil McDougall, engineer, 1235 McGill College avenue.

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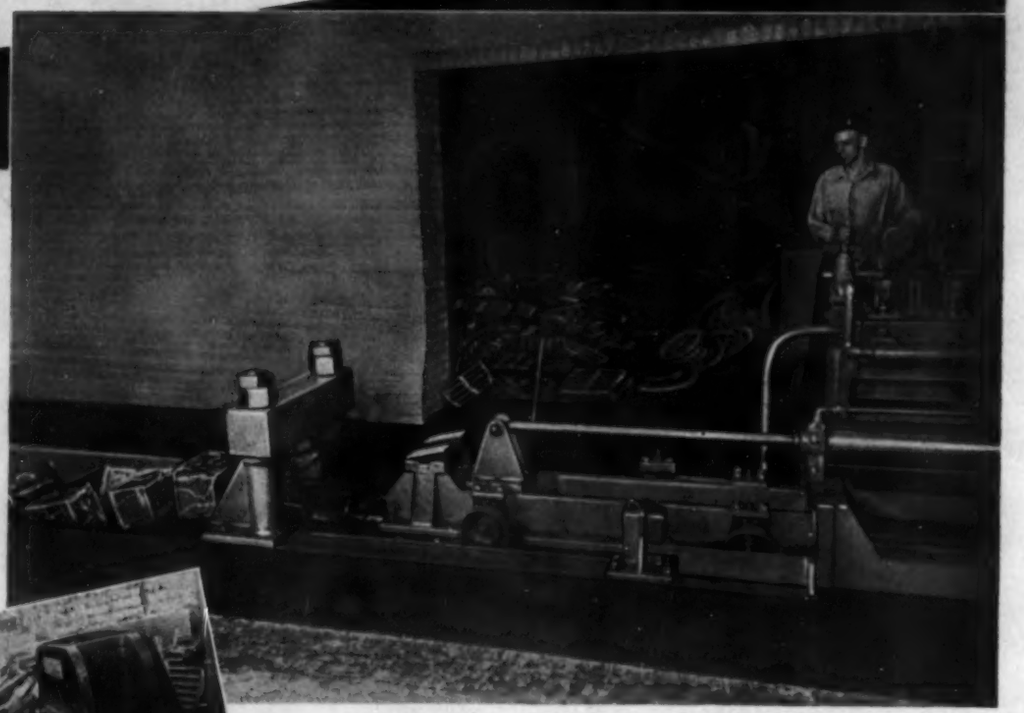

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